AVIATION

The Oldest American Aeronautical Magazine

DECEMBER 13, 1926 Issued Weekly PRICE 15 CENTS

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VOLUME XXI

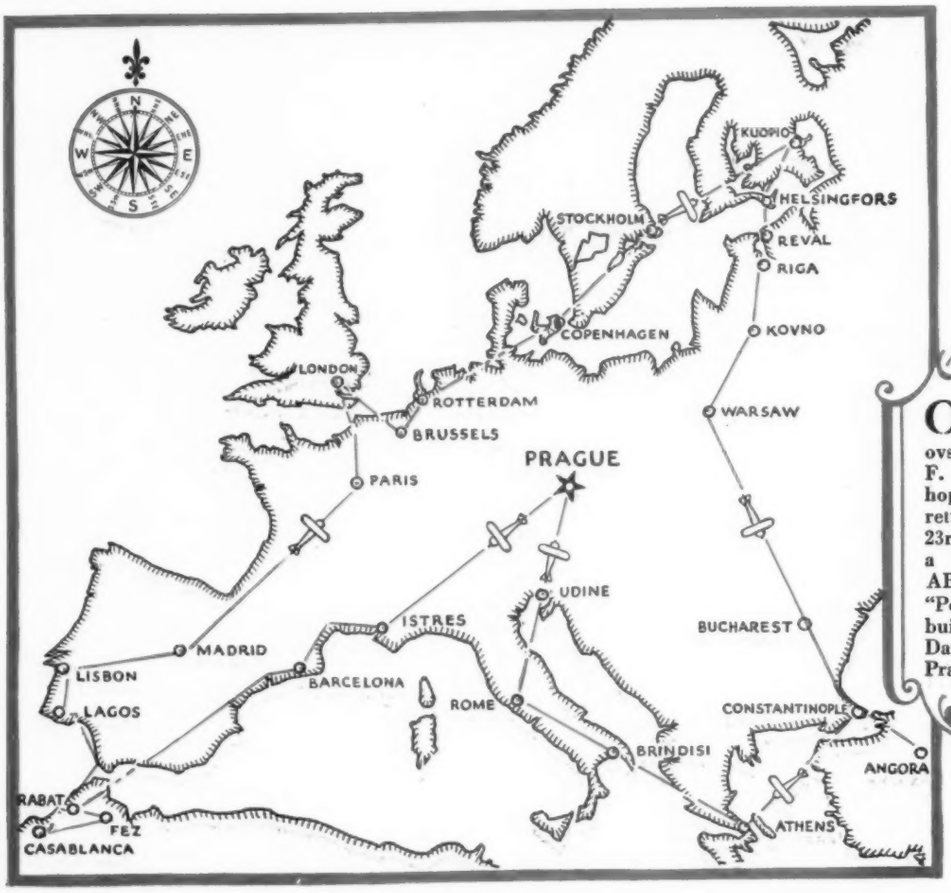
NUMBER 24

SPECIAL FEATURES

AN ECONOMY CHART FOR AIRPLANES
AIRPLANES AND PRIVATE FLYING
AIR MAIL STATISTICS SHOW INCREASED SERVICE

GARDNER PUBLISHING CO., INC.
HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK
Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office, at Highland, N. Y. under Act of March 3, 1879.

The "Round-Europe Flight"



ON May 25th, 1926, Capt. Vilem Stanovsky, *Pilot*, and Mr. F. Simek, *Mechanic*, hopped off at Prague, returning on July 23rd. Their plane was a two-seater "Aero AB-11" powered by a "Perun II" engine built by the Breitfeld, Danek & Company, Prague.

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THE GARDNER PUBLISHING COMPANY, INC.

Business and Editorial Offices:—225 FOURTH AVE., NEW YORK

Cable Address:—AEROENG

Publication Office:—HIGHLAND, N. Y.

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Vol. XXI **DECEMBER 13, 1926** **No. 24**

Index to Contents

NEWS ARTICLES AND ITEMS

Sir Alan Cobham Honored at Aviation Dinner ..992
Aircraft Exports 993
Continental Trip of Byrd Plane Ends 993
Air Activity in Hammondsport, N. Y. 994
New York-Atlanta Air Mail Proposed 994
Air Mail Statistics Show Increased Service 995
Competition for Navy Training Planes 995
Air Mail Bids Asked 998
Portugal Plans Round-World Flight 998
Sikorsky Occupies New Factory 1002
India Restricts Importation of Aircraft 1002

FEATURES AND DEPARTMENTS

Editorials 991
An Economy Chart for Airplanes 996
Lightplanes and Private Flying 999
Notes on Air Speed Indicators 1001
Side Slips 1003
Pictures in the News 1004-1005
The Richard-Penhoet Giant Seaplane 1006
Foreign Aeronautical News Notes 1008
Airports and Airways 1009
U. S. Air Forces 1012
Publisher's News Letter 1019

ADVERTISING INDEX 1018
WHERE TO FLY 1017-1018
AIRCRAFT SERVICE DIRECTORY 1020-1021-1022
CLASSIFIED ADVERTISING 1022

Subscription price: Four dollars per year. Canada, five dollars. Foreign, six dollars. Single current copies, fifteen cents. Back numbers, 25 cents. Advertising rates on application.

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1926, at the Post Office at Highland, N. Y., under act of March 3, 1879.

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With the Editor

Readers of AVIATION will notice a number of typographical changes which have been made in this week's issue and it is sincerely hoped that the general concensus of opinion will be that these alterations improve the appearance of the magazine, which was the sole object of their incorporation. Furthermore, with the cooperation of the Bureau of Foreign and Domestic Commerce, Washington, D. C. a new department is started with this issue, under the heading "Foreign Aeronautical News Notes", in which it is planned to keep readers in touch with the general news of foreign air activities, giving special attention to news of value to the American Aircraft Industry which may tend, either directly or indirectly, to advance foreign trade in aeronautics.

Passing from one thing to another, it will not be out of place to draw attention to the highly interesting discussion by Prof. C. H. Powell, on an economy chart for airplanes. The author has thought it wise to give a clear mathematical proof of the method whereby he has formulated the chart but his article is nothing like so formidable as its appearance might indicate and the empirical use of Professor Powell's diagram in the consideration of an airplane design, especially in the case of small commercial machines, will be found of value.

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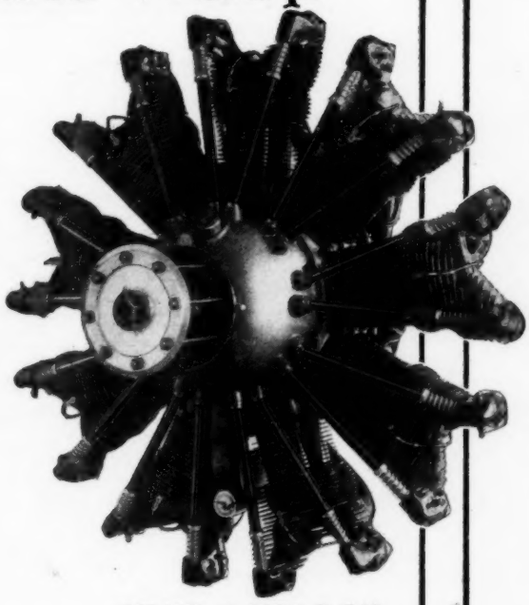

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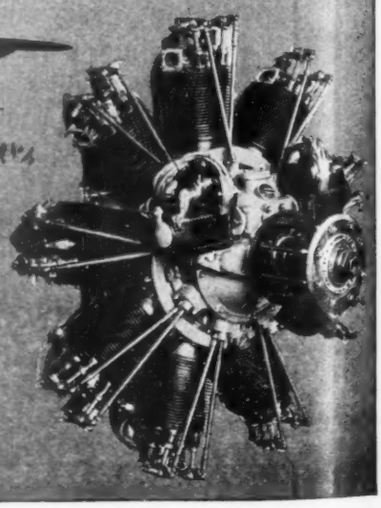


WRIGHT

WRIGHT AERONAUTICAL CORPORATION
Paterson, N. J., U. S. A.

AVIATION

VOL. XXI DECEMBER 13, 1926 No. 24

The Press and Aeronautics

THERE IS no subject on which the average flier will grow more wrathful than in discussing the manner in which the press treats an aviation accident. The flier feels that accidents are given unfair prominence and that, in playing up airplane crashes, the newspapers are showing a deep prejudice against aviation. When a newspaper features a forced landing as an "ESCAPE FROM DEATH WHEN PLANE FALLS 2000 FT.", most fliers reach the boiling point and, if talk could kill, the city editor's job would be much more dangerous than that of the flier.

There is some justification in the pilot's attitude, but he is wrong when he feels that the daily press, as a whole, is prejudiced against aviation. Much of the material on aviation in the press which may seem to be written with antagonism is really the result of ignorance in aeronautical matters, and the natural result of being forced to create news which will appeal to the public. Furthermore, it must not be overlooked that airplane accidents are in reality far less common than are automobile accidents, and this fact alone may, to the newspaper editor, enhance their news value. In fact, it may reasonably be said that genuine airplane accidents are somewhat rare.

The metropolitan press devotes a great deal of space to aeronautics. The prominence which was given the news of the Round-the-World Flight of the Army Air Corps undoubtedly had a very considerable bearing upon the greatly increased public interest in aeronautics which was evident last year. The newspapers have always given all the space that has been deserved to the news of the National Air Races, particularly in recent years, and new speed and endurance records are always prominently featured. The magazine sections of the papers carry many interesting aeronautical articles.

There is a further aspect to this general subject. As already mentioned, it is true that aviation accidents are sometimes given more prominence than are automobile accidents, but, apart from the latter being far more common than the former, automobile accidents are usually much less spectacular than are flying accidents. In exactly the same way, when an automobile establishes a new trans-continental record the news is carried in the automobile sections but when an airplane flies across the continent and establishes a new mark for speed or for endurance the story about it gets a place on the front pages of the newspapers. The event is inherently spectacular.

The larger daily newspapers, in almost every case, now have aeronautical correspondents whose stories are frequently as accurate and certainly as interesting as any articles carried in the daily press. It is up to fliers and all aeronautical people, especially in the smaller communities, to cooperate with the press and try to impart to it some real aeronautical knowledge. The average reporter is really anxious to get the facts but getting the facts accurately and writing them up or telephoning them in at the last moment as a paper goes to press is a difficult matter. The newspapers exert a great influence on public opinion and it should be part of the business of everyone possessing an accurate knowledge of aeronautics to see that the press gets the straight dope and that aviation gets fair treatment.

The Demand for Commercial Engines

THERE IS little doubt that, during the past year or so, there has been a decided change for the better in civilian aeronautics in this country. The barnstormer has become a fixed base operator; he is using business methods and has tangible property and sometimes money in the bank. Airports are rapidly increasing in number and air transport lines have been established. Civilian aeronautics has become stabilized so that the manufacturer of aeronautical products can count on a fairly definite demand and if the product is satisfactory the demand will be continuous and increase in volume.

That constructors of civilian airplanes are supplying this demand adequately, there is no doubt but in the matter of engines this is not altogether true. The engine is really the most important part of the airplane and with the increasing devolopment of various classes of commercial planes, so the demand for specialized power classes of commercial engines will grow.

Although the supply of war surplus engines is not exhausted the possibilities of a scarcity are already in sight. Furthermore, there has been only one surplus engine which has really been found suitable to extensive commercial flying and aerial service, whereas there is already a growing need for other types of engines.

The devolopment of an engine requires a large outlay in experimental costs and until the ultimate demand for an engine can be reasonably foreseen, the expense is not altogether warranted. Yet from the financial point of view there is probably no section of the commercial aeronautical manufacturing field which offers greater certainty than that of the production of engines for civilian machines. The production of aeronautical engines is somewhat specialized inasmuch as it is not a question of enormous production as in the case of the automobile engine, nor is it possible or desirable to put into the production of commercial engines the same overhead charges which are demanded in the case of the military engine owing to the necessity of adhering closely to service requirements. Those who are now considering specializing in the manufacture of civilian engines are entering into a field which has many difficulties but which is so fundamentally important and in which the demand is so inevitable that their future depends only on their ability.

Sir Alan Cobham Honored at Aviation Dinner

Aeronautical Chamber of Commerce Entertains British Flier at Function Highly Representative of American Aviation. Italian Schneider Cup Winner Present.

THAT THE next step in the development of aviation is the thorough education of the American public in the possibilities of the airplane as a means of transportation was the concensus of opinion expressed by the speakers who gathered Monday evening, Nov. 29, to address the dinner in honor of Sir Alan Cobham, the well-known British flier, who arrived in this country Nov. 25, on a lecture tour, with Lady Cobham. The speakers stressed the fact that the myths and misconceptions that have hampered the development of commercial flying have, in the last few years, been dissipated, and aviation enters upon its final pioneer stage, the creating of a public sentiment that will support the unlimited expansion of air lines the country over.

At the Speakers' Table

The dinner, which was held at the Waldorf-Astoria, New York, was under the auspices of the Aeronautical Chamber of Commerce and was one of the most largely attended in the history of American aviation. Four hundred guests, representative of American aviation, were present. Major Mario de Bernardi, winner of the Jacques Schneider Cup Race and Commander Silvio Scaroni, Italian Air Attaché at Washington, were at the speakers' table, as were Assistant Secretary of War for Aviation Trubee F. Davison, Assistant Secretary of the Navy for Aeronautics E. P. Warner, Assistant Secretary of Commerce for Aviation William P. MacCracken, Jr., Capt. H. C. Richardson, U.S.N., Porter Adams, president of the National Aeronautic Association; Harry F. Guggenheim, Will H. Hays, Col. Paul Henderson, president, Aeronautical Chamber of Commerce; Wing Comdr. T. G. Hetherington, British Air Attaché at Washington; S. C. Mead, secretary of the Merchants Association; Maj. Gen. John F. O'Ryan, president of Colonial Air Transport; Maj. Gen. Mason M. Patrick, Chief of the Air Corps; Comm. Emilio Axerio, Italian Consul General; Alfred Reeves, managing director of the National Automobile Chamber of Commerce, and F. S. Holbrook, vice-president of the American Railway Express, which has recently closed a contract with the National Air Transport for the carrying of express by air.

Colonel Henderson was toastmaster and read a telegram from the Hon. Herbert Hoover, Secretary of Commerce, regretting his inability to be present. Assistant Secretary MacCracken, the first speaker of the evening, explained that business had detained Secretary Hoover in Washington, but the absence was compensated in part by the message from the absentee, which was read by Assistant Secretary MacCracken. In this brief address he pointed to the achievements in aviation that have marked the year 1926, the development of the air mail, the progress in commercial flying, and the promise that lies before the industry.

Sir Alan Speaks

To the raising of the British colors and the playing of the British anthem, Sir Alan Cobham was introduced to the diners. He expressed himself as frankly surprised at the progress of aviation in the United States, which considered itself backward in this development. Deploring the attitude that looked upon aviation as a stunt, he contended that it should be lifted from the plane of the spectacular and viewed, not as something superhuman or remarkable, but as a development that must progress along the lines of scientific experiment. His reaction to the flights and victories in the air of recent months was from the side of internationalism, for in them he saw the leveling of barriers between races. He said a British or an Italian achievement was in reality World achievement and not the property of any particular nation. Touching upon the simplicity and safety of flying, the speaker claimed that the prominence given to air accidents by the press was due to the rarity of these accidents, the unusual always finding space on the first pages of all newspapers. Sir Alan said that every city should possess airdromes and cited the example of Berlin, Germany, where officials condemned and even tore down buildings that stood in the way of the construction of suitable facilities for airplanes operating at Templehofer Field. Speaking of the development of aviation, he said "Personally I believe in flying for the sake of flying. I look upon it as a necessary development to the welfare of mankind, and it is for that reason I am an

Sir Alan and Lady Cobham preparing to fly in the de Havilland Moth (Cirrus, 75 hp.) from Philadelphia to Washington.

aviation propagandist. Flying can bring new visions, comfort and pleasure to man. Had aviation been in existence for a thousand years, we would not encounter seven and eight languages in a trip across Europe, such as I did in a recent flight."

The speaker said that in the future a youth of fifteen years would fly as a matter of course, much as he now drives an automobile, because aviation would be one of the necessities of life. He urged the development of lightplanes, because this would encourage private owners, to whom the industry must look for much of its support. Recalling what Secretary MacCracken had said earlier in the evening, regarding his hope that the Schneider Cup might be competed for again over American waters, he went him one better by suggesting that the future might find the race again held in English waters. In closing, he thanked the Aeronautical Chamber of Commerce and his fellow guests for their hospitality.

Schneider Cup Winner Speaks

Major Mario de Bernardi was the next speaker and in an address, delivered in Italian and translated by Major Silvio Searoni, he praised Sir Alan Cobham's contribution to aviation and invited England and America to fly for the Schneider Cup in Italy next year "over the romantic waters of Venice".

Comdr. J. L. Callan, U.S.N.R., liaison officer with the Italian fliers, introduced Lieutenant Bacula, Captain Ferarrin, Captain Guasconi and Major Aldo Guglielmetti, who composed the Italian Schneider Cup team, Signor Castoldi, designer of the winning plane in the Jacques Schneider Cup Race, Signor Ferretti, builder of the engine used in the winning plane and Signor Macchi, representative of the Macchi Company, Italian airplane manufacturers, who constructed the winning machine.

In closing the addresses for the evening, Will Hays paid high tribute to those who developed the air mail, mentioning, in particular, Mr. Otto Praeger, formerly second assistant postmaster general in charge of air mail service, and largely responsible for the early development of this service, who thereupon received a rousing ovation. He called the air mail the greatest of modern achievements and urged upon his audience the necessity for awakening the American public to the time-saving factors of aviation and the sending of mail by air. He agreed with previous speakers that the great need of the day, so far as aviation is concerned, is the arousing of interest sufficient to stand back of air expansion and insure to aviation the chance of proving its worth as one of the greatest servants mankind has ever developed. In this mission, Mr. Hays, saw a prominent place for the Aeronautical Chamber of Commerce. He cited the appointment of three representative Americans during the year to fill the newly created aviation secretaryships in the Government as a step forward and called attention to the many happenings that have filled the news for the last few months as indicative of the larger place aviation is to fill.

In closing, Colonel Henderson briefly introduced each of the guests at the speakers' table.

Others Present

Among those present were: F. B. Rentschler, president of the Pratt & Whitney Aircraft Corp., Chance Vought, president of Chance Vought Corp., Charles L. Lawrance, president, Wright Aeronautical Corp., C. M. Keys, president of the Curtiss Aeroplane & Motor Co., Inc., Comandr. J. C. Hunsaker, U.S.N., Admiral H. I. Cone, of the Guggenheim Fund, Dr. S. A. Reed, Elmer A. Sperry, president of the Sperry Gyroscope Co., Carl B. Fritsche, of the Aircraft Development Corporation, F. H. Russell, vice-president of the Curtiss Aeroplane & Motor Co., Inc., C. G. Peterson, of the Wright Aeronautical Corp., Albert P. Loening and Grover Loening, of the Loening Aeronautical Engineering Corp., Charles H. Colvin, of the Pioneer Instrument Co., Cleburne Eberhart, Jr., president of the Eberhart Aeronautical Mfg. Co., Igor I. Sikorsky, president of the Sikorsky Manufacturing Co., Harold F. Pitcairn, president of Pitcairn Aviation, Inc., Henry C. Ritchie, of the General Electric Co., T. Z. Fagan, of the Scintilla Magneto Co. and Col. Harold E. Hartney.

Continental Trip of Byrd Plane Ends

Harry F. Guggenheim, president of the Daniel Guggenheim Fund for the Promotion of Aeronautics, has authorized the following:

Completing the 7,500-mile coast-to-coast tour of the United States, the Byrd North Pole plane piloted by Floyd Bennett arrived at Bolling Field, Washington, D.C., on Nov. 23. The trip was made through the courtesy of Lieut. Comdr. Richard E. Byrd, in cooperation with the Department of Commerce, and financed by the Daniel Guggenheim Fund for the Promotion of Aeronautics. During the trip, more than forty cities were visited on schedule without mishap or delay of any kind.

The trip was made primarily as a demonstration of the possibilities of commercial flying. Commander Byrd loaned the plane as his contribution to the advance of the cause of aviation, and to further nation-wide use of air travel and the use of the air mail.

At various times during its cruise the members of the crew of the plane participated in the opening of new municipal airports, and at each stop delivered talks on the usefulness to modern business of municipal landing fields, especially along the existing air routes.

The flight started from Washington on Oct. 7. Assistant Secretary W. P. MacCracken, Jr., of the Aeronautical Branch, Department of Commerce; Harry F. Guggenheim, president of the Daniel Guggenheim Fund; Commander Byrd and others made the first trip of the flight from Washington to New York. The plane then followed the northern route across the continent to San Francisco, stopping at Buffalo, Cleveland, Cincinnati, Chicago, St. Louis, Omaha and other intermediate points. The plane then returned by way of Los Angeles, San Diego, Fort Worth, New Orleans and Atlanta.

The completion of this country-wide tour of Byrd's North Pole plane, which is a Fokker monoplane with Wright Whirlwind engines, marks the end of what is probably the first reliability tour covering the entire country to be made strictly according to schedule, the only delay having occurred at Cheyenne where the plane was snowbound for a day.

The flight demonstrated the developments already made in this country along the line of establishing airports. In the forty cities visited, the airports were found to be satisfactorily and properly maintained.

The United States, although better suited both climatically and geographically for flying than many European countries, has lagged behind in using aeronautical transportation to its fullest advantage. Commercial aviation is now available for use. Air mail lines are being extended to cover the most important mail routes, and the air mail companies are maintaining regular schedules in their operation.

Commercial aviation in the United States, however, is being developed without subsidies and, in order for air transportation to develop, the public must make use of the advantages offered for the quick transportation of merchandise, mail and passengers.

I think it is a remarkable demonstration of the advances already made in aviation that the same plane which carried Commander Byrd and Pilot Bennett over the North Pole is able to complete a swing around the country with no more difficulty than would be found in a motor trip over present-day good roads.

Aircraft Exports

The domestic exports of aircraft and engines, from the United States, for the month of September, were as follows:

	Engines	*Value*	*Airplanes, etc.*	*Value*	*Parts, except tires, value*
United Kingdom	4	$1,225.			$260.
Canada	1				1,042.
Salvador		185.			173.
Cuba	1	85.			5.
Argentina	1	335.	2	$9,083.	
Colombia	1	3,005.			23.
Peru					3,540.
Kwantung Isd. Ter.	1	272.			
Australia	2	215.			121.
British East Africa	1	334.			
	12	5,656.	2	9,083.	5,164

The Aircraft Industry in Hammondsport, N. Y.

Three Aircraft Manufacturing Companies Make City An Air Center

By GEORGE NEWBOLD

THIS VILLAGE, celebrated since colonial times for its wine industry, and since 1906 as an aviation center, is unique in having survived the practical wiping out of its two principal industries. Prohibition ruined the wine industry, and the abandonment of the Curtiss airplane and engine war plants suddenly cut off an enormous payroll and scattered far and wide hundreds of skilled aviation workers. Old inhabitants still speak of those boom days in husky tones.

Grapes still grow prolifically on the hillsides of the beautiful Finger Lakes country and find a ready market for purposes outside the scope of an aviation magazine. This transition of the grape industry is somewhat analagous to the adaptation of peacetime aviation in Hammondsport. The big war boom is only a memory but airplanes and parts and components of lighter-than-air craft have again revived the Hammondsport air tradition. Two companies particularly have contributed to this rennaisance, namely, Airships, Inc., which occupies part of the old Curtiss plant, and the Aerial Service Corp., which has adapted a barrel factory to its production needs.

Airships, Inc.

Since shortly after the War Messrs. Callan, Havens and Boyle of Airships, Inc. have been producing airship envelopes and parts. They have also developed several interesting side lines to take up the slack between Government contracts. Their rubber inflated Airboat is widely used by the Navy as safety equipment both in heavier and lighter-than-air operations. Deflated, this little craft may be folded up into a hand parcel. Inflated, it supports two people and may be rowed or paddled. Also, as a water sports proposition, the Airboat has had a considerable sale.

Another safety appliance developed by Airships, Inc. is a flotation bag for airplanes. The bag of reinforced rubber is folded under a light metal cover above the fuselage and behind the rear seat. A steel cylinder weighing about 12 lb. (this will be reduced to 9 lb.) containing carbon dioxide under compression is carried in the pilot's cockpit with hose connections to the bag. By pulling a ring, the pilot releases the gas which expands and instantly fills the bag, giving ample flotation for the plane. The corporation is now working on a Navy order for this equipment for installation on shipboard planes.

Speedboat building has also been taken up by Airships, Inc. They are producing a line of small craft up to 20 ft. for outboard motors known as Buzz Boats. Last Summer these little craft with Johnson Outboard Motors finished first, second and third in the Gold Cup Regatta Baby Buzz class and won and secured planes in several other important speed contests. New models under construction will be decked and covered throughout with the new Goodrich rubber lumber, a light and sturdy material which is impervious to climatic or fouling conditions of fresh or salt water.

Aerial Service Corporation

Harvey C. Mummert, the chief engineer and pilot; J. F. Meade, Gen. Mgr.; and W. C. Chadayne, vice-pres.; direct the activities of the Aerial Service Corp., an organization engaged in airplane manufacture and operation as well as production of both wood and metal airplane and airship parts. They own a well equipped factory with wood and metal working machines, and twelve acres of adjoining land. The factory has railroad shipping facilities and operates its own steam and electric plant. An excellent flying field with good approaches up and down the valley, with a three-plane hangar and gasoline and oil storage, a four-place Standard with high lift wings and C-6 engine and a three-place Mercury training type with C-6 comprise their present field equipment.

The steel Mercury with C-6 engine, which was damaged at the finish of the last Ford Tour, is being reconstructed. The principal work of the Aerial Service Corp. is an Army contract for wood and fabric control surfaces for training airships and the construction of an improved car for T.C. type airships. This car, now in the mock-up stage incorporates several novel features which will be covered in AVIATION in due course.

Flying operations of the company include student training and during the Summer twelve young men reached varying stages of proficiency up to solo work.

A 150 mile tour of the Finger Lakes at $20 per person, when three are carried, is another service which the company plans to put in operation next season, as this region is especially favored by nature from a scenic standpoint and consequently attracts a large Summer colony. This air tour offers interesting possibilities.

Meadowcraft Balloon & Airship Co.

Norman Meadowcraft, a lighter-than-air engineer and designer of considerable reputation in England and America heads this company. At present the company is busy with an order for 22,000 pilot balloons from the Signal Corps. These are small balloons released for testing atmospheric conditions. The Meadowcraft plant has facilities for handling fabric and parts for lighter-than-air work.

It would appear that Hammondsport has become a lighter-than-air center. However, Aerial Service Corp. is essentially a heavier-than-air company which is now engaged on a contract for airship control surfaces—work very similar to the manufacture of airplane flying and control surfaces.

New York-Atlanta Air Mail Proposed

Post Office Department officials are considering various air lines along the Atlantic seaboard with a view to establishing, in the near future, a contract air mail route between New York and Atlanta, Ga.

Three different routes are under consideration and when one of the three is chosen, bids will be invited. There is no question about the location of the northern end of the route. New York, Philadelphia, Baltimore to Washington is the only logical route and Richmond appears to be the next probable stop, but beyond that point there is considerable divergence.

The most favored, from the standpoint of business, is the route paralleling the Southern Railroad lines through Greensboro, Winston-Salem, High Point, and Charlotte, N. C., Greenville, South Carolina, to Atlanta. Because of extensive areas of terraced and cut-over lands through the Carolinas and in northern Georgia on this route, however, flying conditions are described as among the worst in the country. Emergency landing fields could be established only at great expense.

On the other hand a route West of the mountains by way of Roanoke, Virginia, and Knoxville and Chattanooga, Tennessee, is characterized as an ideal flying route with frequent places where ships may be set down for emergency landings. This line probably would eliminate Richmond. Its potential traffic possibilities are not deemed to be so great as that which the more central route would be expected to produce.

The third route suggested runs down the coast line through Raleigh, N. C., Columbia, S. C., and Augusta, Ga. From the standpoint of revenue this route is not believed to be as attractive as either of the other proposed routes.

That one of them will be chosen and a contract let to transport the mails between New York and Atlanta connecting there with the Florida Airways route already in operation, into the Florida peninsula, appears certain. Advices have been received from the Department of Commerce that Congress is to be asked for an appropriation to light those sections of the route necessary.

Air Mail Statistics Show Increased Service

Complete Lighting of Airway, Soon to be Accomplished, Will Save Day in Trans-Continental Time. Sum Received in Air Mail Postage Shows Considerable Increase.

THE LOSS of one business day for mail in transit between the Atlantic and Pacific coasts is the goal toward which the Air Mail Service is working, according to an announcement made recently by Postmaster General New. This will be accomplished when the entire trans-continental route is lighted. Already the way is lighted from New York to Salt Lake City and Congress is expected to provide, at the coming short session, funds for completion of the last leg.

When this is accomplished, planes will be able to leave New York and San Francisco at the close of the business day, instead of in the morning as at present, and to deposit mail on the opposite side of the continent in time for early delivery on the second morning. Saturday's mail, on such a schedule, would be delivered Monday morning, giving to New York's business mail destined to the Pacific Coast the same service it would get to Brooklyn, and giving to San Francisco comparable delivery time in New York to that of mail addressed to Oakland.

Mileage Records

During the fiscal year ended June 30, 1926, planes flying at night carried mail, on the Government operated line, nearly one million miles, the exact figure being 945,654 miles. Total mileage flown, both day and night, during the year was 2,256,-137 miles on a schedule calling for 2,411,059 miles of mail trips, making a percentage of performance of 94. Contract routes, none of which were operating prior to Feb. 15, 1926, added a mileage between that time and July 1, of 378,478 miles.

During the fiscal year the Government operated route transported 353,641 lb. of air mail, of which 107,047 lb. were handled by the overnight service which was inaugurated at the beginning of the fiscal year between New York and Chicago. The poundage for the preceding fiscal year, which did not include the overnight service, was 232,513 lb.

The total excess postage received for air mail transport during the year was $861,865.05, an increase of $259,237.51 over the preceding year. Of the former amount, $160,881.04 was received on the New York-Chicago overnight route.

Since the end of the fiscal year, receipts on the trans-continental route have been increasing by leaps and bounds. For the month of July they were $73,137.45, an increase of $12,-703.80. For August they were $78,275.66, an increase of $18,459.69. September, with receipts of $82,769.59, showed a gain of $22,776.87 over September, 1925, while the October receipts of $90,906.10 were $30,642.82 greater than October of last year. If the gain continues at the same rate throughout the fiscal year, the revenues for 1927 will be virtually double those of 1925.

The greatest forward step in commercial aviation in America since the inauguration of regular night flying resulted from the enactment by Congress of legislation authorizing the Postmaster General to enter into contracts for the transportation of mail by air.

The Contract Routes

Less than ten months ago the air mail map of the United States depicted a straight black line from New York to San Francisco. On Feb. 15, 1926, the black line sprouted two feeders, one being at Cleveland and the other at Chicago and both converging at Detroit, thus marking the first contract air mail routes. Less than two months later another black line appeared on the map which as yet, has made no connection with the main line. This showed a contract route between Miami and Jacksonville, Florida.

In the months succeeding the black lines have been reaching out like claws on a giant crab toward most of the important cities of the United States. In addition to those named, air mail routes have been placed in regular operation as follows:

Chicago, Ill., via Peoria and Springfield, Ill., to St. Louis, Mo., and return.

Chicago, Ill., via Moline, Ill., St. Joseph and Kansas City, Mo., Wichita, Kans., Oklahoma City, Okla., and Fort Worth, Tex., to Dallas, Tex., and return.

Salt Lake City, Utah, via Las Vegas, Nev., to Los Angeles, Calif., and return.

Elko, Nev., via Boise, Idaho, to Pasco, Wash., and return.

Chicago, Ill., via Milwaukee and La Crosse, Wis., and St. Paul, Minn., to Minneapolis, Minn., and return.

Cheyenne, Wyo., via Denver and Colorado Springs, Colo., to Pueblo, Colo., and return.

Seattle, Wash., via Portland and Medford, Ore., San Francisco, Fresno, and Bakersfield to Los Angeles and return.

Philadelphia, Pa., via Washington to Norfolk and return.

Boston to New York via Hartford, Conn., and return.

The Miami to Jacksonville route also has been extended to Atlanta, Ga.

As announced elsewhere in AVIATION, the Post Office Department is now considering a route down the Atlantic coast which, when placed in operation, will give direct service between Boston, Mass., and the tip of the Florida peninsula, with a possible later extension to Havana, Cuba.

Competition for Navy Training Planes

The Navy Department has invited bids from American aircraft designers and contractors for designs of naval training planes. These designs are to be submitted upon a competitive basis, in order to encourage development and to improve the efficiency of naval aeronautic material. The specifications for naval training planes require that they shall be convertible land or seaplane types, equipped with air-cooled engines, and fitted for both primary flight and gunnery training. All bids must be filed with the Bureau of Supplies and Accounts of the Navy by midnight Dec. 21, 1926.

In advertising for bids on designs, upon a competitive basis, the Navy Department desires to adopt a standard design for training planes upon which to base contracts for future needs in that type. The requirements for this training plane competition provide for rating the merits of the design submitted upon a percentage basis. There are four major characteristics of the plane which are given relative importance varying from 15 per cent to 35 per cent. These are performance, arrangement, maintenance and contractural.

Performance, with a weight of 35 per cent. includes stability and maneuverability in the air, on land, and on water; the ratio of high speed to low speed, and the rate of climb to 3,000 ft. Under arrangement, is included vision, disposition of equipment, ease of ingress and egress, and safety. This feature is given a weight of 15 per cent. Maintenance is allowed 20 per cent and includes durability, ease of repair, and simplicity of structure. The fourth point, contractural, with a weight of 30 per cent, covers the time and the cost of production of the planes. The specifications cover the landing speed, endurance, strength and other fixed requirements.

All of the designs forwarded within the time specified will be submitted to a Board to be appointed by the Secretary of the Navy. After appraising the designs submitted, the Board will notify the Secretary of the Navy of the winner or winners of the competition. However, final decision will rest with the Secretary of the Navy.

An Economy Chart for Airplanes

Effect of Wing Area on Speed, Economy and Speed Range Shown Diagramatically

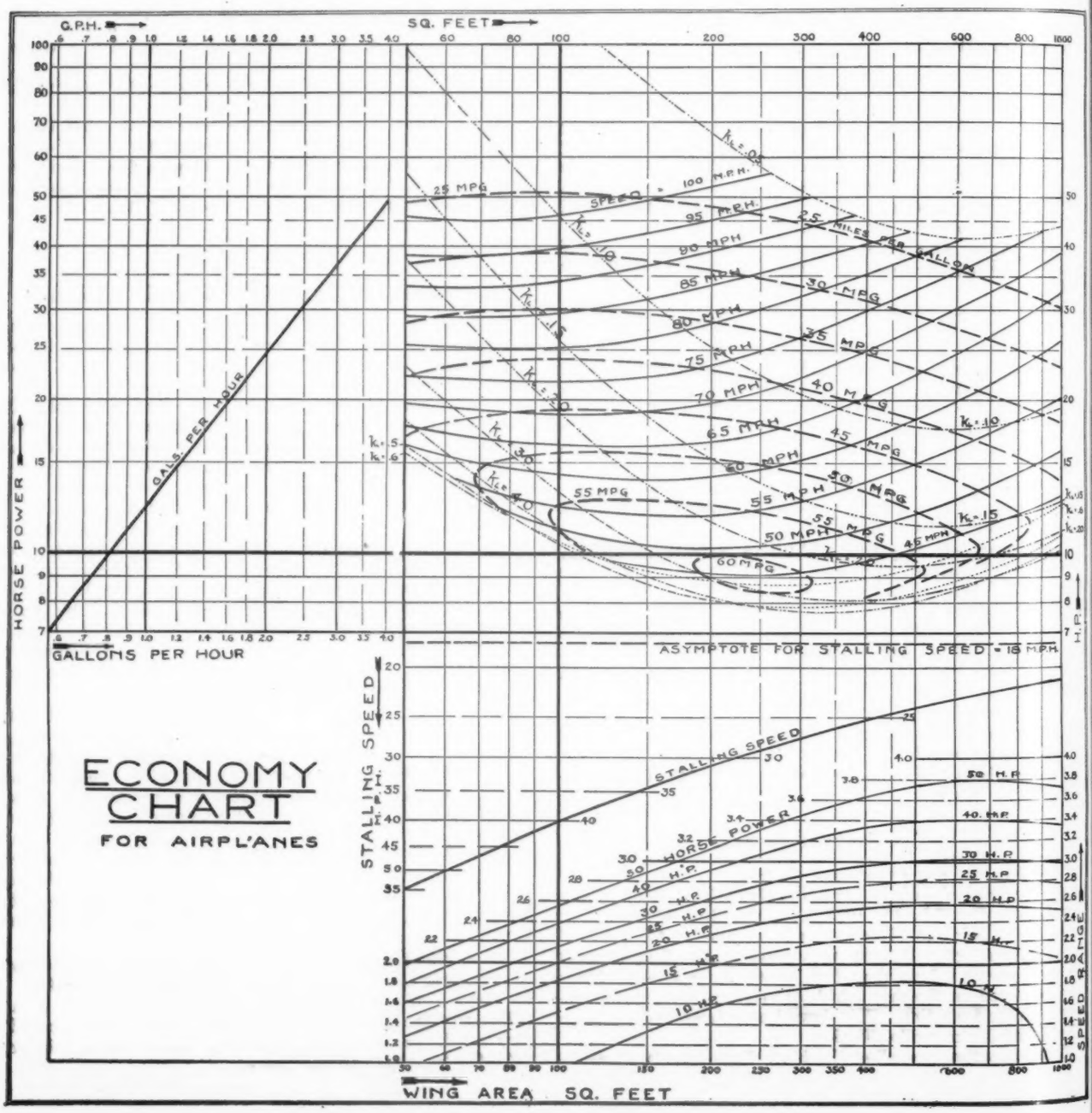
By PROF. C. H. POWELL
Formerly of Aeronautics Dept. University of Detroit

IN SCIENTIFIC investigations of any sort it is frequently found advantageous to change only one independent variable at a time and determine its effect while keeping all the rest fixed. It is the same principle which is effectively applied to the tuning of aero engines for example. It is not easy to sort out the cause of an effect when a multitude of changes in adjustment are made simultaneously.

In the chart about to be described, the performance features of an airplane are investigated for changes in wing area only, all the other factors such as fuselage weight and resistance are supposed to be kept constant. At the present, it is the object to indicate, in a general manner, the effect of change in wing area on speed, economy and speed range for either a given lift coefficient or a given horse power. When the general effect of such alterations are thus known, the influence of other variables may be investigated from this starting point.

This chart, then, represents a series of airplanes, all having the same fuselage and the same engine but differing in wing area. In general, the total weight will depend upon the wing area. The horse power is considered to be varied by the throttle and variations of weight are not considered here for the reason given above.

It will be seen, therefore, that the use of the chart is mainly qualitative but, even so, by the choice of suitable data in its construction it can also be used to give accurate



enough quantitative information as to speed and economy on light planes.

As a basis from which to start, a plane similar to the 1925 Powell Light Plane Racer is taken. The characteristics of such a plane are given below:

Horsepower—30.
Top speed—85 m.p.h. or 125 ft. per sec.
Economy—35 miles per U. S. Gallon.
Wing area (in this particular plane)—76 sq. ft.
Fuselage weight and all weight extra to wings—399 lb.
Wing weight at 1.0 lb. per sq. ft. — 76 lb.
Total weight 475 lb.
Wing Section—R.A.F. 15.

Data for the wing section were taken from Technical Note, N.A.C.A. No. 219, Biplane and Aspect Ratio corrections were made according to N.A.C.A. Report No. 151.

A Practical Example

From these data, a value for the parasite resistance was estimated in accordance with the following:

We, have for horizontal flight, Weight = Lift.

$$\text{or } W = L = k_1 S \rho V^2 \quad \ldots\ldots (1)$$

$$\text{or } K_1 = \frac{W}{S\rho V^2}$$

Where:

V = Speed, ft. per sec.
W = Total weight in lb.
L = Lift in lb.
S = Wing area in sq. ft.
k_1 = Absolute Lift Coefficient
k_d = Absolute Drag Coefficient (wings)
ρ = Standard density = .00238 slugs per cu. ft.

Putting in the values from above, $k_1 = .169$ and, from the wing curve, the corresponding $k_d = .0088$.

The horsepower is given by:

$$\eta H = \frac{\Delta V}{550} \quad \ldots\ldots (2)$$

Where H = Horsepower
Δ = Total drag of plane, lbs.
η = Propeller efficiency

or if $\eta = .80$

$$H = \frac{\Delta V}{440} \text{ or } \Delta = \frac{440\,H}{V} = 105.4 \text{ lb.}$$

when the values $H = 30$ and $V = 125$ are substituted.

Further, we have:

Total Drag = Wing Drag + Parasitic Drag.

$$\Delta = \rho V^2 k_d S + \rho V^2 \Sigma k_b s$$

$$\Delta = \rho V^2 (k_d S + \Sigma k_b s) \quad \ldots\ldots (3)$$

Where k_b = Abs. Parasitic Drag Coeff.
s = Normal Projd. Area Par. Drag

and $\Sigma k_b s$ is the summation of all the parasitic drag areas with their respective drag coefficients.

The expression $\Sigma k_b s$ for the parasitic drag of an airplane is far more convenient and logical than the so-called "Equivalent square plate area" so frequently used.

Substituting the value $k_d = .0088$ and $S = 76$ sq. ft. and putting in the value of $\Delta = 105.4$ lb., then:

$\Sigma k_b s = 2.18$ sq. ft. for the racer fuselage.

This value may be checked by the expression

$$\Delta = \frac{W}{L/\Delta} = \frac{W}{\dfrac{k_1 S}{k_d S + \Sigma k_b s}} \quad \ldots\ldots (4)$$

The expression used for calculating the Horsepower is derived as follows:

Total weight = Wing weight, weight of all other parts

$$W = \lambda S + W'$$

Putting in values $W = 1.0S + 399$ ..... (5)

Where W' = Weight of plane without wings
λ = Weight of wings in lbs. per sq. ft.

From (1) and (5) $V = \sqrt{\left(\dfrac{399 + 1.0S}{S}\right)\dfrac{1}{\sqrt{P}}\dfrac{1}{\sqrt{k_1}}}$ ..... (6)

and $\Delta = (k_d S + 2.18)\ .00238\ V^2$ also $H = \dfrac{\Delta V}{440}$

From (4) and (6) $\Delta = \dfrac{(399 + S)}{k_1 S}(k_d S + \Sigma k_b s)$

Combining (2), (3), and (4):

$$H = \frac{(399 + S)(k_d S + \Sigma k_b s)}{440 \quad k_1 S} \sqrt{\left(\frac{399 + S}{S}\right) 20.5 \frac{1}{\sqrt{k_1}}}$$

$$H = \frac{1}{21.4}\left(\frac{399 + S}{S}\right)^{\frac{3}{2}} \frac{(k_d S + 2.18)}{k_1^{3/2}} \quad \ldots\ldots (7)$$

In the chart, Horsepower is plotted as a function of the area S for constant values of Lift Coefficient k_1. The constant k_1 lines are shown as chain dotted lines.

Minimum Power Estimation

It will be seen that, for a given Lift Coefficient, i.e., a given angle of incidence, there is an area giving a minimum value of horsepower required for horizontal flight. This value can also be found by differentiation and equating the result to zero. This gives the result:

$$S = \frac{.5\,W' k_d + \sqrt{\{6 k_d W' \lambda \Sigma k_b s + (.5\,W' k_d)^2\}}}{2 k_d \lambda} \quad \ldots\ldots (8)$$

The Velocity lines are readily computed from equation (1) and are drawn as full lines. They indicate horsepower H as a function of area S for given velocities. It will be seen on the chart that, for a given horsepower, there is a certain area giving a maximum velocity.

Economy = E is most conveniently expressed in miles per gallon. Evidently,

$$\text{Miles per Gallon} = \frac{\text{Miles per Hour}}{\text{Gallons per Hour}}$$

As a convenient approximation, the gallons per hour is assumed to be proportional to the horsepower, which it is nearly a fact when the engine is not throttled down excessively. Thus, gallons per hour = G.H. Where G = Gals./hp./hr. and the Miles per Gallon = $E = \dfrac{.682\,V}{G.H}$

In the chart, a value of Gallons per hp. per hr. = G = 0.818 has been taken. The Gallons per Hour line is seen to the left of the chart. From this line and the speed lines are computed the Miles per Gallon. Lines which are plotted as broken lines having the form of elongated rings.

Fuel Consumption

It will be seen that there is a maximum maximorum value of miles per gallon of a little over 60 miles per gallon for this particular fuselage, with wing area of 250 sq. ft. flying at 45 m.p.h. and using but 9 hp.

If the Lift and Drag Coefficient of the wing be given, then the condition of maximum miles per gallon at such

Lift Coeff. is found from:

$$\text{Miles per Gallon} = E = \frac{.682\,V}{G.H} \quad \text{but from (2)} \quad \frac{V}{H} = \frac{\eta 550}{\Delta}$$

$$E = \frac{375\eta}{\Delta G}$$

From (4)

$$E = \frac{375\,k_1 S}{G.W(k_d S + \Sigma k_b s)} = \frac{375\,k_1 S\eta}{G\,(W' + \lambda S)\,(k_d S + \Sigma k_b s)}$$

The value for the area S, which gives a maximum value of miles per gallon E, considering K_1 and k_d as constant is found by differentiating E with respect to S and equating to zero. The value of S thus found is given by:

$$S = \sqrt{\left(\frac{W'\Sigma k_b s}{\lambda k_d}\right)} \qquad (9)$$

The following problems worked out by the chart will be ample to demonstrate its use in showing the effect of variation of area with a given fuselage.

(1) Given the horsepower = H = 20. What area is required for maximum miles per gallon. Ans. S = 100 sq. ft.; Speed = 72 m.p.h.; k_1 = .19; the miles per gallon = 43; the speed range = 1.8; the stalling speed being 40 m.p.h.

(2) A plane is to fly at a lift coeff. of k_1 = .2. Find the area which will give the most miles per gallon. Ans. S = 280 sq. ft.; the horsepower = 10; the miles per gallon = .58 and the speed = 49 m.p.h.

(3) Given an area of 150 sq. ft. what horsepower is required for maximum miles per gallon. Ans. Horsepower = 11; miles per gallon = 58, speed = 50 m.p.h. and k_1 = .30.

(4) For a given economy, say, 60 miles per gallon, what area gives the least horsepower. Ans. Area = 280 sq. ft. and horsepower = 8.3.

(5) If the lift coeff. is taken as k_1 = .15, what area will be used to require the least horsepower to fly. Ans. Area = 550 sq. ft., horsepower = 12, speed = 47 m.p.h., and the miles per gallon = 50.

(6) If the horsepower is = 20, what area will give the maximum speed. Ans. Area =110 sq. ft., speed = 72 m.p.h., and the k_1 = .2.

(7) For the given fuselage under consideration and a wing area of 76 sq. ft., what is the stalling speed. Ans. 45 m.p.h.

(8) For a given required economy of 40 miles per gallon, what area will give the highest speed. Ans. Area = 90 sq. ft., and the speed = 79 m.p.h.

(9) Given a horsepower of 25, what lift coeff. gives the greatest speed. Ans. k_1 = .19 and the speed = 80 m.p.h.

(10) For a given constant area = 100 sq. ft., what speed gives the greatest miles per gallon. Ans. Speed = 53 m.p.h.; economy = 56 miles per gallon.

(11) Given a required economy of 55 miles per gallon, what is the smallest area we can use. Ans. Area = 96 sq. ft.

(12) Given a required speed of 70 m.p.h., what area makes the economy greatest. Ans. Area = 110 sq. ft. and the miles per gallon = 45.

Air Mail Bids Asked on Two Routes

Postmaster General New on Nov. 15 invited proposals for the transportation of air mail, under contract, as follows: Chicago, Ill., via Iowa City and Des Moines, Iowa, Omaha and North Platte, Neb., Cheyenne and Rock Springs, Wyo., Salt Lake City, Utah, Elko and Reno, Nev., and Sacramento, Cal., to San Francisco, Cal., and return, a distance each way of 1,896 mi. The bids are returnable Jan 15.

This action is intended to carry into effect the department's policy of relinquishing control of the air mail lines as soon as it was established that private contractors were strong enough to resume their operation. Postal officials today reiterated that the Government is not an operating agency, and even from the inception of the idea of transportation of mail by air there had been no intention of remaining in the transportation field.

Announcement was also made that the proposed new uniform rate of 10 cents a half ounce for air mail, to all points in the United States soon will be put into effect.

The contracts for air mail lines will be let in two sections. The first will include the New York to Chicago leg of the transcontinental route and the overnight route between New York and Chicago, both of which run via Bellefonte, Pa., and Cleveland and Bryan, Ohio.

The second section will be the Chicago to San Francisco route, via Iowa City, Des Moines, Omaha, North Platte, Cheyenne, Salt Lake City, Reno and Sacramento.

The schedule will require an average flying speed of at least 90 m.p.h., with allowance for slower time for weather conditions. The attention of bidders is called to the fact that the Western section is in excess of 1,000 mi., the distance from Chicago to San Francisco by air line being 1,896 mi., and that contractors will be entitled to a maximum revenue of $3 a lb. for the first 1,000 mi., and not exceeding 30 cents a lb. for each additional 100 mi.

A bond of $25,000 is required with the proposal and will run concurrent with the bond furnished under the contract by the successful bidder. The contract bond will be fixed at not less than $500,000.

The accepted bidder will be required to provide necessary workroom space in his building on the field or fields, to permit proper handling and distribution of mails by post office department employees.

Contractors must permit planes of other contractors on connecting lines to land and take-off at all fields on this route when such planes are actually engaged in transporting mails to or from this route.

Fifteen contractors are now transporting mail by air between various points in the United States, and the Post Office Department is well pleased with the performance.

With the recent signing of a contract for transportation of express by air, postal officials feel that commercial aviation is rapidly reaching a stable basis and that continued operation of competing lines by the Government would act as a deterrent to the progress of private initiative in the air. Assistant Secretary Glover, in speaking of the proposals, said, "For the Government to remain in the field would mean duplication of service, since it cannot carry express packages nor passengers and would only operate to deprive commercial companies of needed revenue."

Portugal Plans Round-The-World Flight

The Round-the-World Flight, which the Government of Portugal has planned to undertake, will begin early in January, 1927. The personnel, as selected to date, consists of Major de Beires, Lieut. Jose Cabral, Capt. Jorge de Castilho and Lieut. Manuel Antonio Gouveia. Major de Beires and Lieut. Gouveia will be remembered for their successful flight from Lisbon to Madeira, in 1922, and from Lisbon to Macao, China, in 1924.

The flight will cover 45,000 kilometers, 3,100 of which will be over the Pacific Ocean. Twenty-five stops will be made at the principal cities along the route. A seaplane, equipped with two Lorraine motors, will be used.

Lightplanes and Private Flying

Low Powered Flying As the Basis Upon Which Cheap Airplanes May Be Produced

IN THE unfoldment of any new art, there is always a limited field for speculation of one kind or another regarding the future and what course or series of courses the development is most likely to follow and what may be the eventual outcome. There is, therefore, every reason for giving thought to the possible future of the airplane and flying from the civil and commercial standpoint. This, in general, is a wide subject, being divided, as it is, into three very distinct classes, namely, air transportation, aerial service, and private flying and air touring. Each of these classes represents a study within itself but they all, as a whole, concern the aircraft industry very vitally, since it is a generally accepted conclusion that in commercial and civil aviation very considerable prosperity lies.

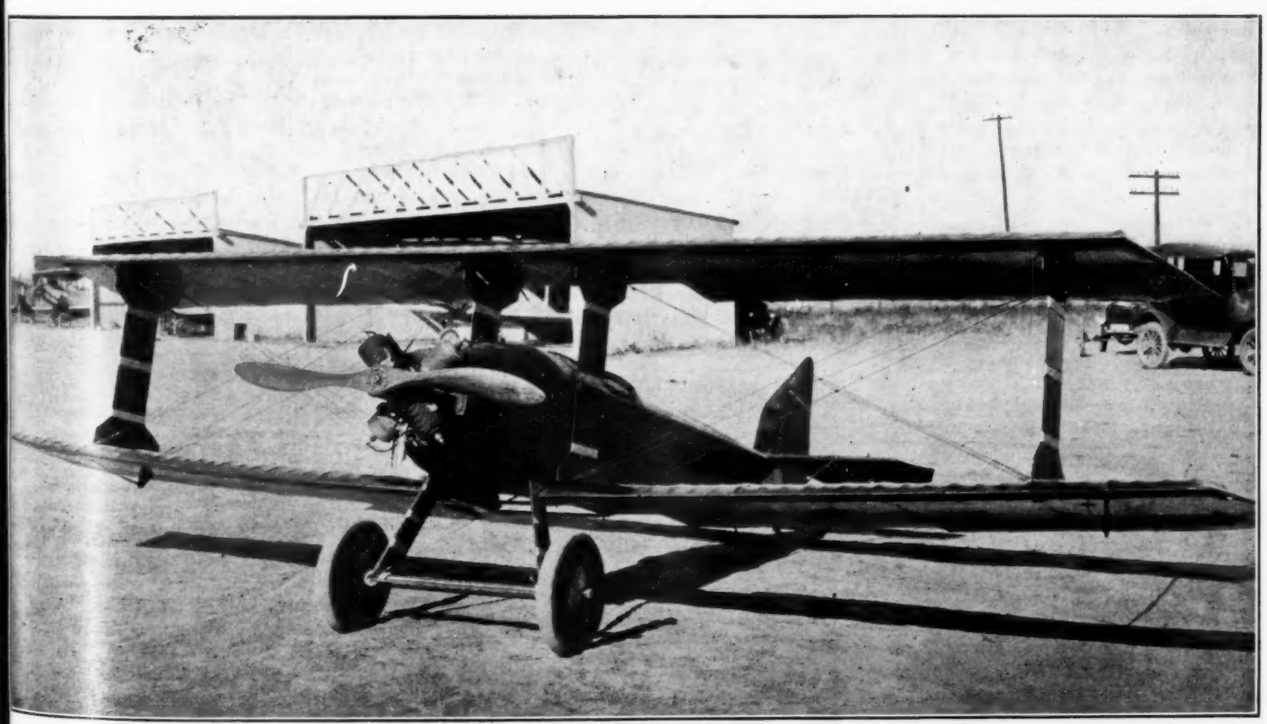
A Definition of Private Flying

At this time it is proposed to set down sundry ideas on the possible future of private flying, without attempting in the least to cover the entire subject or to claim any sequence of thought on the subject. By private flying, it is assumed that a field equivalent to that of the private automobile owner is intimated and that a private flier of the future may be anyone who possesses an airplane for his own personal benefit and pleasure and that of his associates, without any intention of making money out of his ownership. A man, for example, who purchases an airplane to assist him in getting about the country in pursuit of his regular business would be termed a private flier just as much as would be an owner of an airplane which is used solely for flying for the pure pleasure of flying. Such is already the case in the automobile field and the factors which limit the private possession of automobiles may be expected, only to a somewhat more pronounced extent, to limit the ownership of private airplanes.

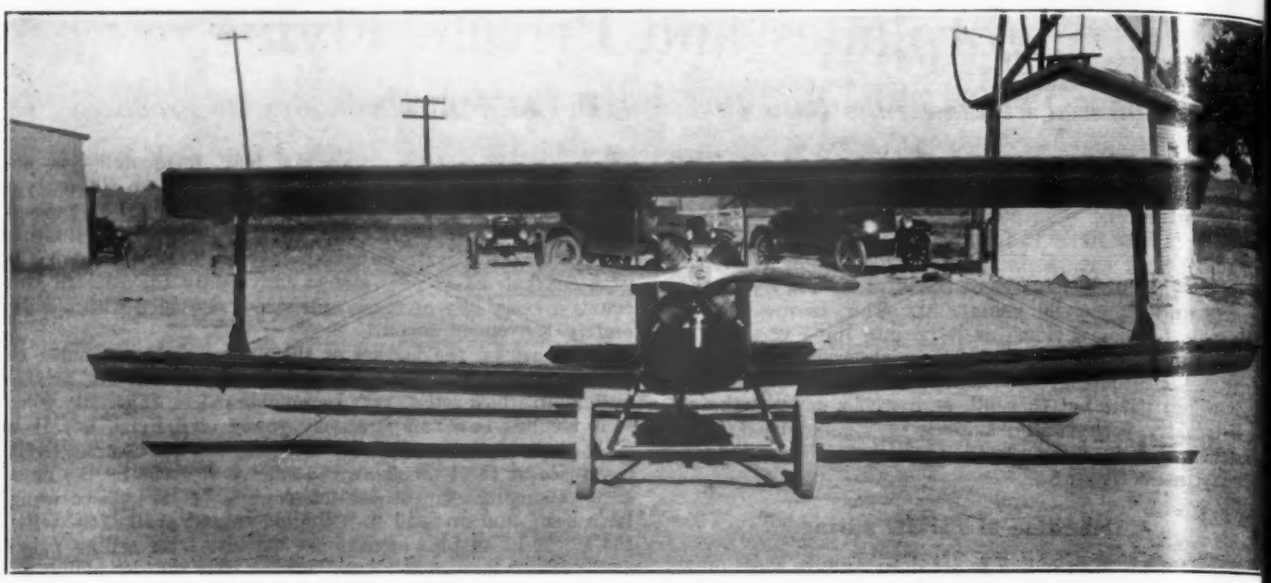
The cost of the automobile, low though it has been reduced, is very largely a factor limiting the even greater ownership of private automobiles. This fact may, incidentally, be accepted generally as a very great advantage since riding over our highways would be even less tolerable than at present were it not so. Price, likewise will prove one of the limiting factors in the private ownership of airplanes, taking it for granted that, as is now almost universally the case in this country, every city of reasonable size is provided with a moderately convenient airport.

There are on the market at the present time a number of very excellent airplanes in the small class suitable for private ownership which sell at very reasonable prices, especially when it is recalled how comparatively young civil flying is. It is fully realized, however, that, in the main, the comparatively low price of these airplanes is rendered possible by the numbers of surplus war production engines of low power which have been, and are still to a limited extent, available. When the stocks of surplus engines are exhausted the selling prices of these airplanes will remain low or soar up, depending entirely upon whether or not other airplane engines of low power are available at a price somewhat comparable with that of the present disposal engine. And this seems somewhat unlikely in view of the absurdly low figure at which it has been possible to purchase disposal material.

Only last week, AVIATION, in an article on the comparative costs of airplane engines and power plants employed in other fields of traction, showed that designers in this country have succeeded, in spite of the extremely specialized problems involved, in producing airplane engines which cost, per horsepower, no more than do other classes of power plants, and in many cases cost considerably less. This would indicate that if we are to have cheap airplanes for private ownership, we must reduce the power required for flight in such planes in order to bring the cost of the power plant down. There is some comfort also to be found in the realization that, if, under the present conditions of limited production, we have been able to compete favorably in point of selling price with other



A LOW POWERED FLIER. The single-seater Irwin Meteorplane (Irwin Meteormotor 20-25 hp.) which has such a good performance



Another view of the Irwin Meteorplane (Meteormotor 20-25 hp. engine)

power plants, then, when aircraft engines are sold in larger numbers for civil purposes, the prices will go down even further.

The lightplanes which have been produced in this country and abroad have served to indicate with considerable certainty that flight, with a very satisfactory performance and even some reserve power, can be carried out on what we have been led to consider as very low powers. In England, very largely as a result of the encouragement from the large cash prizes offered by the Air Ministry and the Daily Mail, this low-powered flying has been encouraged and developed to a marked degree, as was very notably demonstrated in the last Lympne competition held in September. The winning plane, the Hawker Cygnet, carried 429 lb. of useful load (nine pounds more than the empty weight of the plane) over a total distance of 1994 miles, covered during a week of flying, at an average speed of 65 m.p.h. with a Cherub, 30-35 hp. engine.

In this country, too, in spite of there having been no official encouragement and little or no competitive encouragement, considerable progress in really low-powered flying has been made. Philadelphia, during the National Air Races this year, saw several very excellent lightplanes, among which may be mentioned the Heath Tomboy (Cherub), Driggs Dart (Wright Morehouse) and Meyers Midget (Cherub). Certainly one of the most interesting examples in the lightplane class both in this country and abroad, demonstrating the possibilities of low-powered flying, is to be found in the Irwin Meteorplane equipped with the Meteormotor developing 20 hp. This little plane may justly be described as of the lightplane class in every sense of the term since its total weight, including engine, is but 230 lb. and the Meteormotor, which has a displacement of 72 cu. in., weighs but 60 lb. The machine has never been fully described in AVIATION in the past. Its manufacturers claim a maximum speed of 90 m.p.h. for the plane with a landing speed of 32 m.p.h. and a rate of climb, for the first minute, of 400 ft., with a ceiling at 15,000 ft. The Meteorplane has a span of 20 ft. and an overall length of 14 ft.

A Practical Lightplane

This little machine has proved very successful and a really practical airplane in every sense of the word. A recent incident may be cited in point. V. C. Gorst, president of the Pacific Transport Company, was flying in one of the company's service planes from Los Angeles to Portland, Ore. and landed at the Irwin Airport, Sacramento, Cal. en route. In landing, one of the big tires of the Ryan Monoplane blew out and no replacement tire of that size was available at the field. Mr. Gorst was in a hurry to continue the flight and the nearest place from which a spare tire coud be obtained was Mather Field, 11 miles away. Accordingly, a Meteorplane was dispatched in a 40 mile wind to procure the spare tire which it brought back strapped to the side of the fuselage, landing back at Irwin Airport exactly nineteen minutes after leaving for Mather Field, having bucked a cross wind all the way.

In the development of this little plane, some of the problems which have been met with and overcome are of special interest. Firstly, in the matter of turnbuckles—standard sizes were found too large for the machine and the manufacturers would not make a special turnbuckle without an order for a very large quantity. So the Irwin Aircraft Company made its own turnbuckles for the Meteorplane. Furthermore, the smallest wheel and tire on the market was found too large for this little lightplane and again no manufacturer would produce the requisite size of wheel and tire without the assurance of an order for a quantity and, accordingly, the Irwin company manufactured its own wheels and tires. The same trouble was experienced in obtaining a suitable magneto for the little Meteormotor. This, too, had to be a special job and very light, with the result that the Irwin people are now making their own distributors, buying the other parts and assembling their own magnetos.

All these details serve as an example of the study which has been put into the development of the comparatively few lightplanes which have been produced in this country and are indicative of the seriousness with which this field of development work must be carried on. Such airplanes must undoubtedly have a wide future. Their initial cost is not likely to be high, especially when larger numbers of them are turned out and the upkeep of the lightplane is exceedingly low as are also the running costs.

How soon flying of this nature will become regular is a point of some speculation. Initial cost will still for some little time have an important bearing upon this question and possibly a way out will be found, at least temporarily, in the formation of clubs such as the Waterbury Lightplane Club which has recently been formed at Waterbury, Conn. by a small group of enthusiasts, none of whom could afford an airplane of his own but each of whom now has the use of the Club's Jenny. In this way, especially where the maintenance of the club's plane or planes is carried out by the members themselves, the cost of flying per hour to a member can be brought as low as from six to seven dollars, in addition, of course, to his annual dues. There is little doubt that these clubs will spread and so increase the field for the production of light low-powered airplanes for private sport purposes which will at first be purchased by the clubs and will eventually be bought in increasing numbers by private owners belonging to clubs or otherwise.

Notes on Air Speed Indicators

Some Practical Information on the Most Used of Airplane Instruments

The following notes, relating to the use and maintenance of air speed indicators, have been supplied by the Pioneer Instrument Company, Brooklyn, N. Y., and are, in view of the fact that the air speed indicator is one of the most used of instruments in an airplane, likely to prove of considerable practical value to all airplane operators.—EDITOR.

AN AIR speed indicator is a sensitive differential pressure guage. It indicates in terms of air speed at sea level, the pressure resulting from the flow of air past the Pitot-Static-tube to which it is connected.

The pitot-static tube consists of two separate tubes, one of which has an open end which receives the full impact of the moving air. The other tube is closed at its forward end and has small holes or slots some distance back from the end. These transmit to the interior of the tube the static pressure which may be more or less than the static pressure in the cockpit where the indicator is located. Some pitot-tubes are made with the pitot and static units concentric so that they appear as one tube. Any properly made pitot-static tube can be used with any pitot type air speed indicator, no calibration or adjustment being required.

The impact head (Pitot) and static tubes of an air speed indicator

The air speed indicator has two prime uses. The first is as a "buoyancy meter". The support of the airplane depends upon the velocity and density of the air passing under its wings. The indicated air speed being a function of both speed and density, this instrument serves to measure the support or buoyancy of the airplane. The readings of an air speed indicator are correct in terms of true speed only at sea level. At higher elevations the readings are less than the actual speed, due to the decreased density of the air. Since the support to be obtained from the air decreases with its density, however, the indication continues to be a correct measure of that support. In other words, if the stalling speed of an airplane at sea level is 45 m.p.h., it will stall at higher altitudes, at an indicated speed of 45 m.p.h. in spite of the fact that the actual speed may be much more. Related to its functioning as a support indicator, the air speed meter becomes an indicator of the fore-and-aft attitude of the airplane when considered in conjunction with the Tachometer. For a given engine speed, there is a certain air speed corresponding to level flight. If the air speed reading increases, it indicates that the airplane is descending. If the air speed reading decreases, it indicates that the airplane is climbing.

The second use for the air speed indicator is as a navigational instrument. Taken in connection with the time of flight and corrected for wind and altitude error, the air speed indicator enables a pilot to keep some check upon the distance he is traveling.

The air speed indicator is installed on an instrument board in the same way as any other instrument. Care must be taken to see that the outlets come in such position that connecting tubes can be brought to them conveniently. It is also desirable that the indicator be mounted close to the tachometer, as these two instruments are used together in estimating fore-and-aft attitude.

The pitot-static tube on a conventional airplane of the biplane type should be mounted about two-fifths of the way down from the top plane on a wing strut which is well clear of the propeller slipstream. On externally braced monoplanes, a suitable place can usually be found on a wing strut. On internally braced monoplanes it is generally necessary to extend the pitot tube mounting from two to four feet ahead of the wing, or from 18 to 24 in. below it, to reach a position of undisturbed air.

Metal Tubes Recommended

The connections between the pitot-static tube and the indicator should be made with metal tubing. Copper tubing of 3/16 in. outside diameter is recommended. At the lowest point in the connecting tubes, provision should be made for a drain. Special "T" fittings are supplied with all Pioneer air speed indicators. The connecting tubes are attached to two sides of the "T" and the third outlet is closed with a special cap which serves as a very convenient drain. Joints in the connecting tube should preferably be made with soldered metal fittings. If rubber tubing is used, great care must be taken to be sure that the joints are perfectly tight.

The connections of the pitot-static tubes and indicators are marked P (pressure) and S (static) and care must be taken to see that the tubing runs between like-lettered connections.

An air speed indicator connected with soldered metal fittings requires no attention except the periodic removal of the cap from each drain "T", and the draining of any water which may have accumulated. Instruments connected with rubber tubing should be carefully inspected at intervals of not longer than six weeks and the rubber tubing replaced as it deteriorates.

More air speed indicators are damaged by being blown into or sucked upon than in any other way. The pressure or suction required to secure an indication of 120 m.p.h. is only about six inches of water pressure. An ordinary person can

The dial of a Pioneer air speed indicator

exert a lung pressure of eighty inches of water and can suck about twice this amount. Thirty inches of pressure applied to the pitot connection, or the same suction applied to the static connection, of an air speed indicator will damage it so as to make it unfit for use. The possibilities of damaging an air speed indicator in this way are very great, and extreme care must, therefore, be exercised.

Possible Causes of Trouble

Troubles with air speed indicators become apparent in three different ways. First, failure of the hand to return to zero. Second, incorrect speed indication—usually too low. Third, sluggish movement of the hand and failure to respond quickly to changes in speed. The source of the trouble, in any particular case, may lie in the indicator or may be due to leaks or stoppages in the connecting tubes.

Regardless of the difficulty, the first step in locating the source of trouble is to disconnect the tube lines from the indicator. If the trouble was failure of the hand to return to zero, note if the hand comes back when the connections are removed and the instrument tapped gently. If the hand comes to zero, the trouble is in the lines. If the hand does not come to zero, the trouble is in the indicator, which should be removed from the board. One of two things may be wrong. Water may have found its way into the diaphragm, or the diaphragm may have been subjected to excess pressure. Manipulate the indicator so as to let any water run out, if trapped inside. If none appears, and the hand continues to remain off zero, send the instrument to the factory for repairs. If the instrument is of the proper range for the airplane upon which it was mounted, it cannot have been damaged by excess pressure imposed in flight. The usual cause of such damage is to be found in the use of the indicator as a "lung-tester" by a mechanic or receiving clerk.

The Pioneer air speed indicator vertical instrument dial.

If the hand returned to zero upon disconnection of the lines, the instrument was O.K., and the trouble is due to water in the lines, which should be drained out.

Incorrect readings may be due to poor calibration or to mechanical defects in the indicator, but such troubles are so rare they can be dismissed pending the investigation of every other possible source of difficulty.

Low readings are usually due to leaks, and sluggishness to stoppages in the lines. Tests for both are easily made. First, since the instrument is now disconnected, try the indicator itself for leaks, stoppage or friction. Attach a length of rubber tube to the static (S) connection. While carefully watching the hand of the air speed indicator, suck very gently on the end of the rubber tubing until the hand reaches about one-half of the full range, then close the tube by pinching or by putting your tongue over the end. The hand should stand still or return toward zero very slowly. It should not travel over 10 miles in the scale in a shorter time than 30. sec. If the hand moves faster than this, there is a leak in the case and the instrument should be returned to the factory for repairs. If the movement of the hand is within this limit its approximate rate should be noted.

Now open the rubber tube, and note if the hand drops back quickly to zero. If it does not, there is a stoppage or excess friction in the indicator and it should be returned to the factory for repair.

Assuming that the indicator showed no leak in excess of the limit, and that the hand dropped back to zero as it should, proceed to test the tube lines for leaks and stoppages.

Connect the pitot line to the static side of the indicator (where the rubber tube has been during the previous test). Slip the rubber tube over the end of the pitot tube of the pitot-static tube. Have someone watch the dial of the indicator. Suck gently on the rubber tube, having the observer stop you when half scale is reached. Close off the rubber tube, and have observer note if the indicator hand moves toward zero any faster than when the instrument alone was tested. If so, a leak is indicated. Leaks are almost always at joints, although split tubes are occasionally found. By breaking into the line at each joint and retesting, the leak may be located by a process of elimination.

After the line has been made tight it may be tested for stoppages. Suck on the rubber tube as in testing for leaks, until the hand reaches half-scale indication. Open the tube and note if the hand drops back to zero quickly. If not, a stoppage is indicated. This may be located by breaking into the line and retesting.

The same process of testing for leaks and stoppage may be applied to the static line, but as it is impossible to make a direct connection to the static tube of the ptiot-static tube, it is necessary to disconnect the line, and to attach the rubber tube directly to the disconnection tube.

Once an air speed indicator installation is properly made, particularly if soldered metal connections are used, it should last for the life of the airplane without any attention beyond the occasional draining of water. If trouble does develop, its source may be quickly located if these directions are carefully followed.

Sikorsky Occupies New Factory

We were informed that the Sikorsky Manufacturing Corporation, on Nov. 15, leased the major part of the assembly building of the former L.W.F. Aeroplane Company located at College Point, Long Island. For the start, the Sikorsky Corporation will use space of 22,000 sq. ft. with an option to increase this space up to 40,000 sq. ft.

The former L.W.F. plant is one of the best and largest airplane factories in the country, the assembly building being 700 ft. long 100 ft. wide and 35 ft. high. The factory is located on the East River and has a water front from which seaplanes or amphibians can be launched. Land planes can be put on barges and transported to a nearby field adjoining water. Arrangements have been made for the use by the Sikorsky Corporation of a machine shop located on the premises which is the former L.W.F. Company's machine shop. This shop is equipped with all modern machinery and all kinds of mechanical work can be done there.

After moving to the new location, the Sikorsky Corporation will immediately start the construction of another three-engine plane, a duplicate of the late S-35 and a series of twin-engined amphibian and land planes.

India Restricts Importation of Aircraft

A recent notification of the Government of India prohibits the import by land into certain specified areas of British India, except under a license granted by certain specified authorities, of aircraft or parts of aircraft such as are indispensable for the operation of the type of aircraft for which they are intended, and for that purpose have been given a special or quality which would not be essential for their use for any other purpose.

The restricted areas are the administered districts and political agencies of the Northwest frontier province as well as British Baluchistan and the Baluchistan Agency territories. The two licensing authorities are the chief commissioner and agent to the governor general of the Northwest frontier province, and the chief commissioner of British Baluchistan, and agent to the governor general of Baluchistan.

Side Slips

By ROBERT R. OSBORN

The newspapers recently printed the picture of the model of a German seaplane, which, when and if built, is supposed to be able to cross the Atlantic in thirty-six hours. The article states that it will have a wing spread of a hundred yards, will have ten propellers, ten thousand horse power and will carry a hundred and thirty passengers and a crew of thirty-five. It is all very well to publish figures like these, some folks might be interested in them, but we refuse to be amazed until we find out if it will have a kitchen on board capable of serving a seven-course dinner. The newspapers recently stated that a British airship in the process of building will have a kitchen capable of serving a six-course dinner, and unless the designers of other countries can improve on that they can't claim any progress at all.

• • • •

In this country we seem to be quite far behind in this respect, as hardly any of our commercial planes could be rated at more than a four-course dinner. It is high time that some wealthy philanthropist helped to relieve the situation by offering a large prize to the first successful designer of a machine capable of serving a seven-course dinner. This trophy could be open to competition annually at the National Air Races with an appropriate point scoring system. For instance, the speed with which the courses are served should enter into the consideration, stick and unstick time for the passengers, as it were, and a certain number of points should be allowed for each passenger surviving.

You can appreciate how poor conditions are over here, when the newspapers recently boasted in large headlines that tea had been served in one of the newly commissioned air liners.

This week's Faint Praise Prize has been unanimously awarded to the insurance company, which, after a long series of actuarial surveys, states that flying is practically as safe as riding in automobiles. We hope the company is well prepared to back up these statements as some of the flying service companies doing a large commercial business might sue. If the word gets around to the public in general that flying isn't any safer than that, the commercial business might be completely ruined.

• • • •

We are reassured in reading that Mr. Ford is attempting to develop an improved type of water-cooled airplane engine. With all of his airplanes being equipped with air-cooled engines, for a time, it looked as if that fine old tradition that no Ford was really working well until it was boiling over, might be lost to posterity.

• • • •

The reporter interviewing Major de Bernardi when he was sailing for home, discovered that when he was winning the Schneider Cup Race the Major carried a small doll with him as a mascot. It is too bad that this was not known during the race, for then the congratulating Americans would have known that the correct retort to "So's your old man" was "Yes Sir, that's your baby."

• • • •

Mr. G. S. I. seems to have discovered another way of making a bit of money out of the airplane business. The field at which he has his establishment has accumulated such a collection of freak inventions that he is considering gathering them all in one hangar and charging a quarter admission to see them. This side show idea should appeal to the owners of the flying circuses.

• • • •

The Intrepid Aviator came in the office the other day and seemed to be considerably worried. Some months ago he loaned a parachute to a stranger who left his car as security. The stranger hasn't returned as yet and our friend is wondering whether it is the 'chute or the car which is worthless.

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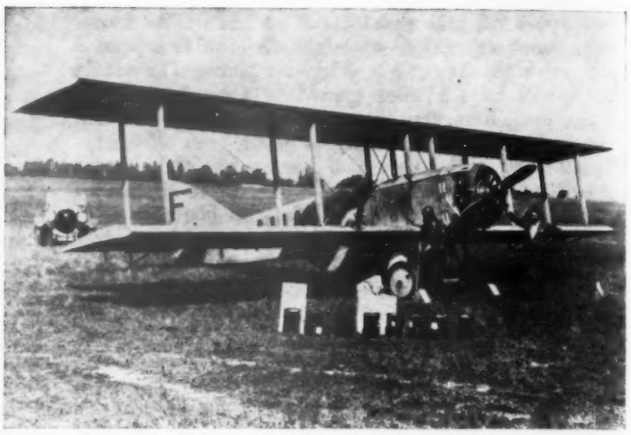
PICTURES

(Above)

AN AERIAL FLOTILLA. A fleet of Navy DH4's flying in stepped-up echelon formation at San Diego, Cal.



(Above)

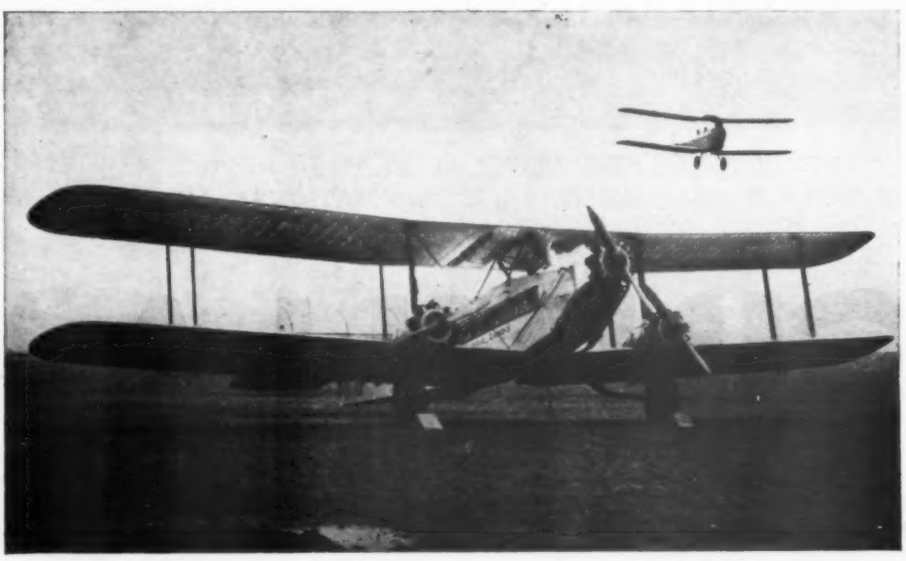
FOR DELIVERY BY AIR. The famous French flier, Lieutenant Thoret, preparing to leave in his Farman with provisions to be dropped by parachute to the observatory on Monte Blanche.

(Above and right)

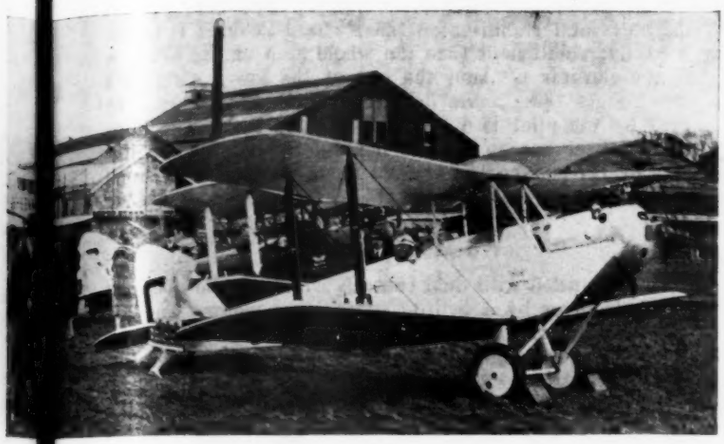
WHERE TO PUT THE GASOLINE. The Breguet IXA-2 (Lorraine-Dietrich) has been used on the French long distance flights which have been made recently. This picture gives a very excellent idea of the method employed of storing the necessary gasoline in tanks surrounding the body of the machine.

(Below)

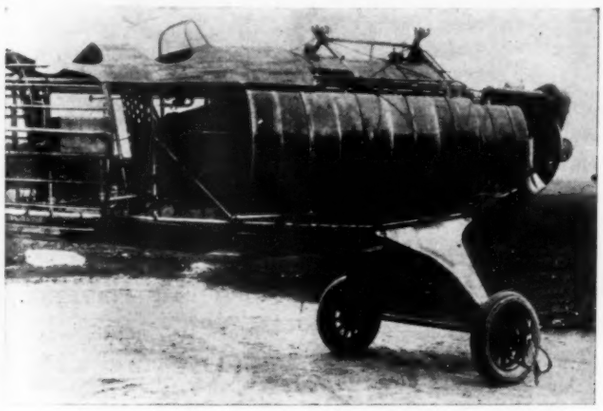
A NEW PASSENGER CARRIER. The new three-engine de Havilland Hercules (Jupiter 450 hp.) for the Egypt-India air route, giving an idea of the placement of the engines to avoid overlap.

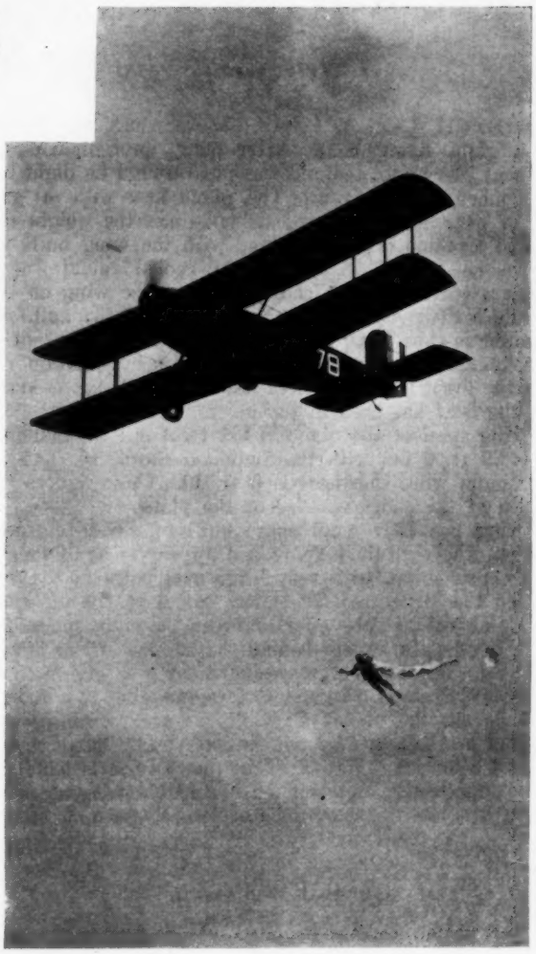


THE NEWS



TOURING. Bernard Lette and Neville Stack, in two DH Moths (Cirrus, ne London Nov. 15 for India and probably Australia to demonstrate the possi- ing.

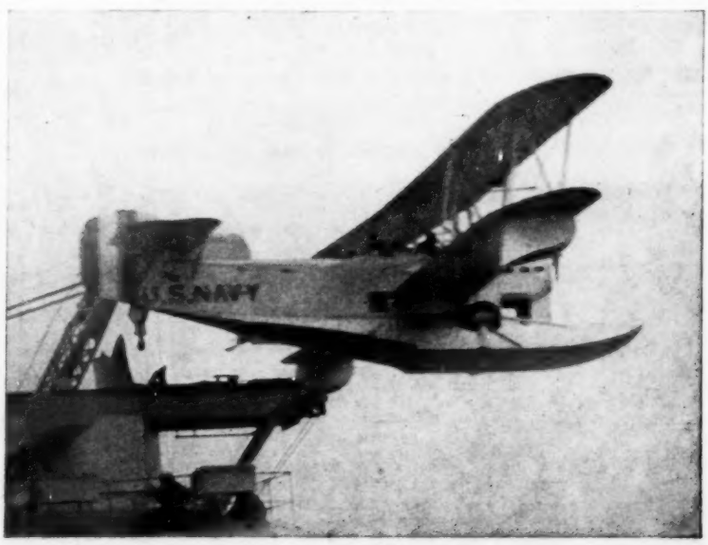




(Above)
THE AIRMAN'S LIFEBELT. A practice jump giving an excellent idea of the function of the pilot parachute in drawing the main 'chute out of the pack.

(Below) A Navy Loening Amphibian being catapulted during the recent tests of high power catapults for large planes.

(Left)
BUDDY GOES TOO. The Navy's Torpedo and Bombing Plane Squadron No. 1. Scouting Fleet under the command of Lieut. Comdr. E. W. Spencer, U.S.N. has flown in less than a year 216,000 miles without a single forced landing. Their operations have been at Guantanamo, Cuba; Norfolk, Va.; and Newport, R. I.; and Buddy, the Squadron Mascot, is in practically continual flight with the Squadron.



The Richard-Penhoet Giant Flying Boat

A New Giant Five Engine Flying Boat Built in France.

A FRENCH designer, P. A. Richard, conceived in 1920 a giant flying boat. After many preliminaries, the boat was completed and was put through its flight tests in September of this year. The plane flew with a gross weight of over 36,000 lb. or some ten times the weight of a DH. The machine is a monoplane with the wing built into an enormous hull. Two 420 hp. air-cooled raidal Jupiter engines are carried in the leading edge of the wing on each side while a fifth engine is set in the bow of the hull. The total power is thus 2,100 hp., making the machine one of the largest flyingboats ever built. No official information concerning the flight tests have been issued and all that is known is that the boat has been in the air for several hours.

The wing span of the plane is 131 ft. 2 in.; the maximum chord is 29 ft. 6 in., with the minimum chord, 16 ft. 5 in.; the maximum wing thickness is 5 ft. 10. These figures give some idea of the enormous size of the plane.

The wing has four main spars built of wood reinforced with steel. They are thick spars and appear to be of the box type of construction, with very large oval holes in the webs to lighten the structure. The spars are 4 ft. 10 in. apart. There are also three false spars between the main spars. The covering is of cloth, except behind the engines where duralumin is used. The wings were designed for a safety factor of 6 and have withstood a sand test corresponding to a load of 150,000 lb. for the plane. The ailerons are of considerable length and are balanced by two sets of paddle balances both above and below the ailerons. The wing section is Eiffel No. 391, a characteristic of which is its small movement of the center of pressure. The section has been slightly modified to conform to the requirements of structural strength.

The Hull and Cabin

The hull of the Richard-Penhoet flyingboat is 85 ft. 10 in. long, 10 ft. 9 in. high, 13 ft. 3 in. wide. There is a double bottom and the hull is divided by eight transverse bulkheads. There is only one step and, as this is built on separately, it can easily be repaired in case of damage. The hull structure covering varies from a thickness of .236 in. to .585 in. It consists of a plywood of spruce, birch and teak. As in the wings, there is a considerable amount of steel construction incorporated in the hull. The cabin is placed under the wing and has seating capacity for twenty passengers. The pilot and navigator sit up in a cockpit which is built in above the wing. The wing tip floats are 8 ft. long.

The five Jupiter engines are accessible from the rear during flight for the wings being over five feet thick, afford easy passage way. There are eight tanks of 110 gal. capacity each, which gives seven hours of flight at full throttle. The tanks are set in the wings and can be emptied in case of necessity in 30 sec.

The engineering problems involved in the construction of a plane of this size are very considerable especially when the matter of the control surfaces is studied. The fixed portion of the horizontal stabilizer on the Richard-Penhoet is larger by a considerable extent than the whole area of the Waco 9, while the elevator is about the size of the lower wing of a Waco. To get these areas balanced so that they can be handled by the pilot is a very complicated task. The horizontal stabilizer has an area of 354 sq. ft. and the elevator an area of 117 sq. ft. The vertical fin is comparatively small having an area of only 42 sq. ft., while the rudder has 74 sq. ft.

Servo Motor Control

The boat is fitted with dual controls which can be operated either by hand or by a hydro-electric servo motor. The ailerons and elevators are balanced by paddles. An air starter is used to start the engines. The tachometer and the gasoline gauges are electrically operated. Fire extinguishing apparatus, which can be operated either by hand or automatically, is part of the equipment. Radio with a range of 500 miles, is part of the equipment of the plane. The crew consists of two pilots, a navigator and a mechanic.

The weight of the plane light is 25,300 lb. and the weight loaded 38,500 lb. which gives a useful load of 13,200 lb. The wing area is 2,889 sq. ft. and the total power, as already stated, 2,100 hp. giving loadings of 13.3 lb. per sq. ft. and 18.3 lb. per hp.

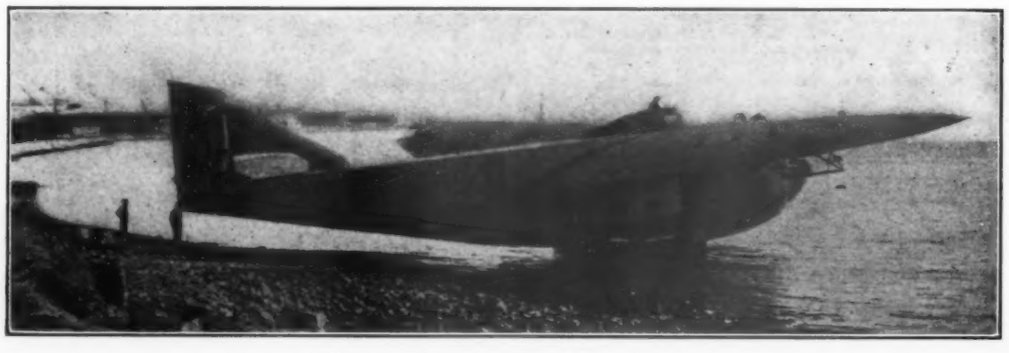
The boat was designed for service over the Mediterranean between France and Africa. Several larger types have been projected for service between Africa and South America but the present type will probably have to be experimented with to a considerable extent before larger boats are built. Experimental aircraft, as a rule, cost at least $15 a pound and often more, so that this one giant flying boat must have cost in the neighborhood of $400,000.

International Commission of Air Navigation Meets

The International Commission of Air Navigation held its eleventh session in Paris during November, 1926, with twenty-two nations represented. The United States, which had unofficial observers at previous meetings of the Commission, was not represented this year.

Among important decisions taken at the Commission were the following: Action regulating the procedure of technical inquiries into accidents occuring to aircraft in foreign countries; simplifying the international model of the "carnet de route" (traveling permit) for aircraft; completing requirements to be met by candidates for navigators' licenses; preparing, for the projected Washington radio-telegraph conference of 1927, an outline of proposals relative to the use of wireless in air navigation.

The twelfth session of the Commission will be held in April, 1927, at either Lisbon or London.



The giant Richard-Penhoet monoplane flyingboat (five 420 hp. Jupiter engines)

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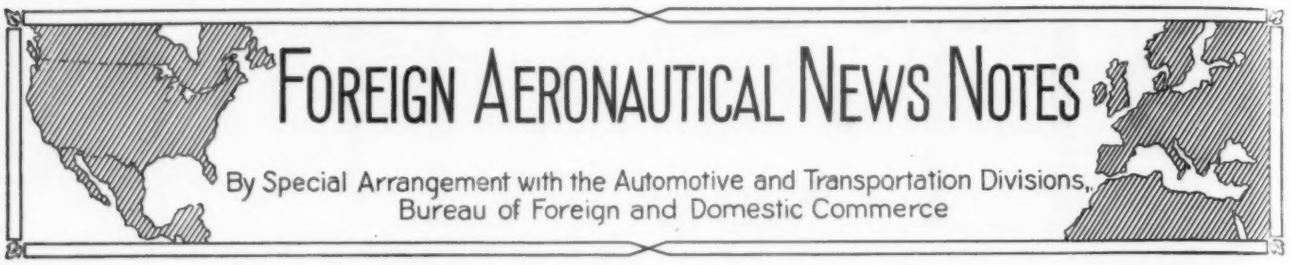
FOREIGN AERONAUTICAL NEWS NOTES
By Special Arrangement with the Automotive and Transportation Divisions,
Bureau of Foreign and Domestic Commerce

International Air Mail Conference Projected

Plans to hold a conference of European postal administrations to discuss air mail problems, were launched at a recent meeting of the air transport committee of the International Chamber of Commerce at Paris.

The proposed conference would be limited to postal administrations directly interested in air traffic, and its purpose would be to study necessary modifications in the international postal convention. Representatives of France, Belgium, the United States, Hungary, Sweden, Germany, Switzerland, and Czechoslovakia are reported to have expressed interest in the proposal.

Some European Air Lines Closed for Winter

The passenger air service between Lyon and Geneva has been completely discontinued until next Spring. Since Oct. 4, the service Paris-Lyon-Marseille, hitherto daily, has been operating from Paris on Mondays, Wednesdays and Fridays and from Marseille on Tuesdays, Thursdays and Saturdays.

The air service between Helsingfors and Stockholm was closed for the year on Oct. 1. This service, which opened on June 1, carried 782 passengers, 2096 kg. of mail, 10,811 kg. of luggage, and 803 kg. of freight. During the same period last year, 430 passengers and 340 kg. of mail were carried. From Jan. 14, when the air traffic between Helsingfors and Reval began for the current year, until the last of September, 2,355 passengers, 8,429 kg. of mail, 26,343 kg. of luggage, and 2,170 kg. of freight were carried, compared with 653 passengers and 344 kg. of mail last year.

Another Australian Air Service Planned

Proposals to establish an air service between Perth, Adelaide, and Melbourne have been made to the Postmaster General's Department, Australia, and are now under consideration. The proposal is to establish a weekly service at 90 m.p.h., flying day and night, leaving Perth at 9 o'clock on Tuesday morning and arriving at Adelaide at 2 o'clock on Wednesday, and at Melbourne six hours later. Although it is proposed that private enterprise carry out the service, the Postmaster General is anxious to obtain guarantees of public patronage to make the mail service worth while financially. A minimum of 25,000 letters each day each trip would have to be guaranteed and a surcharge of 3d. per half-ounce letter on this number, in addition to the revenue from passengers, would be considered a sufficient inducement for the introduction of the service. The delivery of mails by the air service would reduce by four days the delivery of oversea mails at Melbourne by way of Freemantle.

Import Restriction on Certain Aircraft and Parts

A notification of the Government of India dated Sept. 22, 1926, prohibits the import by land into certain specified areas of British India, except under a license granted by certain authorities, of aircraft or parts of aircraft such as are indispensable for the operation of the type of aircraft for which they are intended, and for that purpose have been given a special shape or quality which would not be essential for their use for any other purpose. The restricted areas are the Administered Districts and Political Agencies of the Northwest Frontier Province as well as British Baluchistan and the Baluchistan Agency Territories. The two licensing authorities are the Chief Commissioner and Agent to the Governor-General of the Northwest Frontier Province, and the Chief Commissioner, British Baluchistan, and Agent to the Governor-General of Baluchistan.

Latin Americans Attend Aviation Congress in Spain

The Hispano-American Aviation Congress, which was held recently in Madrid, Spain, was attended by the Ambassadors of Portugal and all the Latin American countries and by special delegates from Argentina and Uruguay.

During the congress consideration was given, among other things, to a study of the basis of a customs and transportation agreement between the Spanish and Latin American countries, which would eliminate unnecessary customs formalities and facilitate the reciprocal interchange of aeronautical equipment and the supply of raw materials to be utilized in this industry. A preliminary discussion was made relative to the formation of an Ibero-American aeronautic agreement which would provide for complete liberty of contracts and agreements between Spain and the Latin American republics.

It was urged that the Spanish aeronautical industry is sufficient, not only to provide for the needs of the country, but also sufficient for contracts to be taken for the supply of aeronautical equipment to the other countries.

Resolutions were taken approving commercial treaties between Spain and Latin American countries, in which special favored national treatment would be accorded to Portugal, the Latin American republics and the Moroccan zone.

Polish Airplane Factory to be Formed

A contract for the establishment of an airplane factory near Warsaw has been signed between the Skoda Works of Prague, Czechoslovakia, and the Polish Government. After the ratification of the contract by the Government of Poland, a joint stock company, capitalized at 1,000,000 Polish Zloty, will be formed under the name "Aeroplane Factory of the Skoda Works in Poland" which will take over the former airplane factory "Francopol," founded by French capital and later owned by French and Polish interests. The new company, in which the Government will be financially interested, will be fully controlled by the Skoda Works. As soon as the most urgent reconstruction work is completed it is planned to start manufacturing Lorrain-Dietrich airplane engines. The Skoda Works have already obtained the necessary license for their manufacture in Poland.

The Swedish Airplane Industry

A recent report has been received in the automotive Division of the Bureau of Foreign and Domestic Commerce, Department of Commerce, on the activities of the Swedish Aircraft Factory (aktiebalagst Flygindustri) at Malmo, states that since its inception in February, 1925, a total of fifty-three complete planes had been turned out. Of this number, twenty-five are reported as having been made for three countries of South America, these being all of the military type, and twenty-eight machines, including both military and commercial types, have been made for European governments and firms.

A study of their quoted prices shows that a three-engined bombing plane, powered with 330 hp. Junkers engines, listed at $90,000.. a light single-engine pursuit plane, with the same engine, listed at $16,000., and the same plane with the 220 hp. Junkers engine sells for $15,000. Everything is made under special order and contract; terms, 50 per cent cash down and the balance on completion.

Airplanes for Finland Free of Import Duty

Airplanes intended for general passenger and mail transportation, imported into Finland during 1926, are free of import duty according to a Finnish law of Sept. 24, 1926.

AIRPORTS AND AIRWAYS

Bettis Field, Pittsburgh, Pa.

By D. I. Lamb

H. C. Neel, owner of Bettis Field, has recently concluded negotiations for the erection of a large steel hangar at the western end of Bettis Field, for which foundations are now being laid.

Jimmie Clausen has his Jenny set up and is seriously considering giving it a test flight. The meat wagon and the wrecking car are both out of commission—hence the delay.

D. M. Walters is putting in a thousand gallon tank with electric pump for servicing planes. Long run gas meeting Government specifications will be used exclusively.

"Curley" Lovejoy has placed an order for two Nicholas-Beazley Standards to be used for training his large class of students.

Russell Brinkley, organizer of the model class at the McKeesport Y.M.C.A., returned the de Lloyd Thompson plane to the field and is now contemplating gray hair trying to reassemble it. The crate has too many parts.

The telephone and light wires at the S. E. corner of the field have been buried during the past ten days, giving a far better approach from that direction.

A lunch counter has been opened at the field where credit is good. This was also financed by H. C. Neel.

Clifford Ball, air mail contractor between Pittsburgh and Cleveland, expects to start operations about the first of the year using this field as a terminal.

Memphis, Tenn.

The agitation, which has ensued for more than a year, and which has been backed by the Memphis Aero Club and the local press, achieved its object on Armistice Day, when Armstrong Field, at Woodstock, was formally dedicated.

It was the first air meet ever held in Memphis and brought forty planes to the city to participate in the races. The field was named in honor of Lieut. Guion Armstrong, a Memphis aviator, who died in action during the World War.

Mayor Paine opened the ceremonies in an address that sketched the history of the campaign to give Memphis a field. He was followed by Major Gen. Johnson Hagood, who formally named the airport. As he did so a plane started for the field, performing a series of tailspins and loops. This was a signal for the free-for-all race. Two De Havillands, one Douglas and one Whirlwind Laird participated in this race, which was for twenty-four miles, or four times around a six mile triangle. Mathew Laird in his Whirlwind Laird came in first by twenty feet. His time was 12 min., 18 sec., or 116.5 m.p.h. The Douglas, with Lieut. Aubrey Hornsby, of Montgomery, Ala., as pilot, finished second.

The thriller of the day was supplied by Miss Phobe Fairgraves who walked the wings of Lieut. Vernon C. Omlie's plane, performed various stunts in mid-air, and finally dropped in a parachute from a 1,200 ft. altitude.

Little Rock won a silver loving cup for the best formation flying in the National Guard, the planes being Jennies. Nashville was first in the Jenny race of eighteen miles, Lieut. F. B.

Major De Bernardi used

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MARIO DE BERNARDI

B. G. Midget Spark Plugs further proved with 100% success their reliability in the **PN-10 Planes** which attempted the non-stop flight to Panama.

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McConnell finishing in 12 min., 45 sec. Lieut. W. Vermilyea of Little Rock came second with a 13 min., 57 sec. record.

One of the planes from Maxwell Field was equipped with an aerial camera and took official pictures of the field for the aviation corps of the U. S. Army.

Another Young Flier

Reports relating to another "World's youngest flier" are at hand, coming from Detroit, Mich. Frank Rippingill, student at Guyton school in Detroit, is said to have successfully passed the examination and tests of the Federated Aeronautique Internationale and for the license issued by the National Aeronautic Association of America, for airplane pilots at the age of thirteen.

Memphis, Mo.

By Lee R. Briggs

Flying in this part of the country has been very much hampered by early winter, with snow and rain and fog. However much activity has been in evidence. Flying has been resorted to when the automobiles were unable to travel. This is as it should be only more so. The Ford Transport operated by N.A.T. has been making trips over the field almost weekly. Pilot Jim Lewis of Chicago dropped in the other day with his Waco. He has been barnstorming in this locality even though it has been rainy.

The new Air-King was demonstrated at our field this week by Glen P. Remkey of Lomax, Ill. This is sure a fine flying little plane. It is strictly modern in every respect and both flies and looks good. It will make its mark among the commercial jobs of today. Messrs Talley & Thompson of Ottumwa, La., have purchased a Jenny from our local flying field and are soloing now. They were assisted in their training by Everett M. Bodeker who has finished the course in flying at the local school here. Bodeker has returned to his home in Lyons, Ore. where he will build up a few airplanes. He not only secured his F.A.I. license this Summer but piled up over 100 hr. solo time.

Ames, Iowa.

Ames, Iowa, is one of the latest cities to establish an airport. One mile East of the city, at a point which borders on both the Jefferson and Lincoln Highways, the Gerbracht Aeronautic Corporation has opened a field. It is marked for cross-country travelers with a large cement circle in the center and a 15 ft. by 50 ft. sign marked Ames has been painted on the hangar.

The Gerbracht company uses Travel Air planes and reports cross-country passenger carrying very successful. Fifteen students have made applications for entrance into the aviation school maintained.

Denver, Colo.

By M. J. McInaney

The weather continues very mild and clear in Denver and vicinity and there is considerable activity at the various fields.

The new Powder River Fying Club at Casper, Wyoming has purchased for the twenty-six resident pilots, two planes, one a Standard and the other an Eaglerock. They plan to rapidly increase membership and interest in the club.

The Air Service Club of Denver is following the footsteps of the Casper organization. Plans for a flying club were discussed and seriously considered at their last regular luncheon.

Wyoming Airways, Inc. recently ordered five Eaglerocks for spring delivery.

Pilot Jack Frye and Dr. Costenbader of Los Angeles, Cal. took off from the Alexander Airport this week in their new Eaglerock and, homeward bound, spent Thanksgiving Day crossing the snow capped Rockies.

G. Torlotting of New York City has taken the Eaglerock dealership for New York and Connecticut States. He has purchased two planes with which to operate in his district and will have a new demonstrator at Curtiss Field as soon as delivery can be made.

Construction has been completed on the hanger at Alex-

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ander Airport and that organization is ready to welcome visiting pilots and their planes.

Alexander Aircraft Company report the cash sale of six planes in recently, all for immediate delivery, and the sale of six others on which a deposit has been made for spring delivery. The personnel has been increased to sixty-four men on account of the present schedule of output, which is three planes per week.

Atlanta, Ga.

By Wm. B. Hartsfield

Candler Field, Atlanta's municipal airport, is now provided with a standard marker in the form of a 100 ft. circle. A repair shop, locker room and rest room, for pilots and the public, equipped with electric lights, telephone and other improvements, have been built by the city.

The city and county governments are planning upon enlarging the runways and installing a complete lighting system for night flying and undertaking various other improvements on the field involving the expenditure of about $50,000 next year.

A campaign is now in progress in the smaller cities of Georgia to have the names of towns painted on some large building for the guidance of fliers. An effort is also being made to establish emergency fields in the smaller towns.

The committee in charge of the field is endeavoring to induce all the larger cities between Atlanta and New York and Atlanta and Chicago to work for the establishment of fields so that air routes may be opened. The Florida Airways, Inc., is now successfully operating a mail line from Atlanta to Miami and the Post Office Department has announced a prospective line between New York and Atlanta.

Candler Field is a municipal airport, controlled by the City of Atlanta. The purpose of the city government is to aid and encourage aviation. Visiting pilots are especially welcome and will be extended every courtesy and consideration.

The following rules have been established by the landing field committee for the conduct of those using the field:

AIR RULES

1. No planes will be allowed to fly on Candler Field unless they are kept in safe and airworthy condition. Pilots shall make regular inspections of their ships and will be held strictly accountable for this provision.
2. Pilots will not be allowed to fly low or dive in the direction of crowds on the field, automobiles or other obstructions such as might endanger life or property.
3. Pilots expecting to engage in passenger carrying on Candler Field must first satisfy the committee in charge of their ability and experience.
4. Pilots using Candler Field to fly over Atlanta or other adjacent towns must keep at all times a safe altitude such as will enable them to glide to a safe landing. Flying dangerously low over large crowds or sporting events will not be allowed.
5. Planes landing on the field must be given full preference over planes taking off, and all pilots are expected to note carefully other plane movements before taking off.
6. No stunt flying or other hazardous exhibitions will be allowed directly over Candler Field or over the City of Atlanta, or over public gatherings at any place by any pilot using Candler Field, without the consent of the committee in charge.

GROUND RULES

1. All pilots landing on Candler Field are requested to register their names, addresses, type of equipment, its ownership, the time of their arrival, expected time of departure and destination.
2. All pilots using Candler Field in passenger carrying are expected to observe uniform prices for the same.
3. No planes shall be parked upon the field other than at the line, unless due to breakage when the same shall be removed as quicky as possible.
4. No motors will be left running in planes without a pilot or competent mechanic in the same.
5. Commercial planes will park a reasonable distance from mail planes so as to avoid any congestion or hindrance to the movements of mail planes.
6. All pilots, mechanics and others employed on the field are expected to police their space and to keep the same free from trash and other refuse.
7. It is hereby made the duty of every pilot, mechanic or other persons employed on the field to aid in the carrying out of these rules and also to see that the general public uses due care and caution, and further, to aid in preserving and protecting the property and equipment of the City of Atlanta on said field.

Fuller Flying Field, St. Petersburg, Fla.

By George S. Robbins

Thanksgiving Day 1926 will long be remembered in the history of St. Petersburg as one of the outstanding events for many years to come.

On that day, when most of the country was sitting down to a turkey dinner, with the wind howling outside, and the

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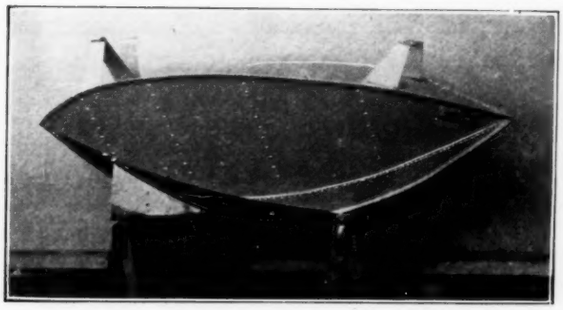

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EDO AIRCRAFT CORPORATION

COLLEGE POINT, L. I., N. Y.

master of the house wondering how much the coal bill would amount to, 40,000 citizens of this famed "Sunshine City" swarmed out to Fuller Field and witnessed the dedication of one of the South's largest and most complete landing fields.

Fuller Field, named for Walter Fuller, prominent citizen and developer of this city, was obtained after six short weeks of work on the part of the Aero Club of St. Petersburg. The ball was started rolling following a series of editorials appearing in one of the leading newspapers of the city. Several sites were offered the club and received consideration, but Mr. Fuller's site was finally decided upon.

The field is located five miles West of the city and is accessible by both bus and street cars. It is of the "L" type, each arm being 3,500 ft. long and 650 ft. wide. The terrain of the field is flat, pilots landing on it having termed it "soft as velvet."

Five planes from Maxwell Field, Ala., took part in the dedication exercises. The detachment was commanded by Lieut. Col. G. H. Daniforth, attached to the Fourth Corps Area. There were also several commercial planes at the airport during the day, including "Miss St. Petersburg" the huge Stout monoplane of the Florida Airways Corp. Regular mail service is to be rendered St. Petersburg on Dec. 24, when the Florida Airways will extend its line to St. Petersburg.

Corning, Cal.

W. N. Woodson, prominent hotel man of Corning, Cal., has donated to the town of Corning a 240 acre tract of land, one half mile from town, on which he has erected hangars with housing facilities for four planes, and spacious quarters for shop, office and living rooms for the field personnel of the Klamath Air Service Co., who are the occupants of the field.

The field is graded and properly marked and the rocking of runways is now under way. A gasoline pump has been installed and aviation gasoline and oils are available at all times.

The Kalmath Air Service Co., which now operates fields at Klamath Falls, Oregon and Glendale, California, will, together with conducting a school of aviation, establish at Corning a sales and distribution agency for the well-known Waterhouse Aircraft, Inc., Cruzair and Roman planes and the Bull's Eye Bailey engines.

The field is known as the Woodson Airport and is in charge of J. E. Hart, who extends a hearty invitation to all fliers to visit the field while in that part of the country.

Electra, Tex.

The Crescent Aero Service is the name selected for the new airport, which Electra, Texas, is now constructing. Passenger carrying and instruction will be handled and the field will be ready by Jan. 1.

Airplane supplies, gasoline and oil will be available and all visiting pilots are invited to use the field.

UNITED STATES AIR FORCES

Three Mitchel Field Hangars to be Heated

By Jan. 1 it is expected that Mitchel Field at a cost of less than $7,000 will have three heated hangars. In spite of the moderate cost, this is probably the most important improvement that has been made at the field. At least, it represents a well earned victory. During former winters it was practically impossible to work in the hangars more than half the time. Even when the weather was only moderately cold, little in the way of efficiency from mechanics working with numbed fingers could be expected.

Present plans call for the walling and ceiling of three hangars by soldier labor, for use, respectively, by the 1st and 5th Observation Squadrons and the 61st Service Squadron. The service squadron hangar, which also serves visiting planes, will be heated from the central heating plant, while the 1st and 5th Squadron hangars will have individual low

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Okla. & Tex. Panhandle—Southwest Airplane Sales Corp., Okla. City
Virginia and North Carolina—J. S. Charles, Richmond, Virginia.
W. Mo. and E. Kan.—Bennett Eaglerock Sales Co., Kans. City, Mo.
E. Mo. and Arkansas—Bridgeton Aircraft Corp., St. Louis, Mo.
N. Y. and Conn.—G. Torlotting, Curtis Field, N. Y.
Western Kansas—C. E. Steele, Dodge City, Kansas
Wyo. and Montana—Wyoming Airways Inc., Casper, Wyo.

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pressure steam heating systems.

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Air Corps Tests Tires by Moving Pictures

A series of drop tests, ranging in height from three to thirty inches, have been made at the material division, McCook Field, to determine to what extent airplane tires absorb shocks in landing. The drops were made with three standard size tires, 28 x 4, 32 x 6 and 36 x 8, the load varying from 1,000 lb. on the 28 x 4 tire to 2,000 lb. on the larger sizes.

The results were studied by means of slow-motion pictures, the relative deflections disclosing the energy dissipated by the tires to be from 15 to 20 per cent of the load, with standard air pressures. Similar test will be made on an oleo landing gear leg, with and without the tire and wheel.

Crissy Field Improved

Continuous effort and work for the past two years has improved the landing field at Crissy Field, Presidio of San Francisco, Calif., immensely. Although there is a slight bend, the runway is the total length of the field and, thanks to the excellent drainage system, planes can land and take off regardless of the weather. The flying field is now 5,600 ft. long by 400 ft. wide, and has been resurfaced, rolled and planted with grass.

Crescent City, Cal. to be Naval Air Base

By G. K. Spencer

The engineering staff of the Aircraft Squadrons of the Battle Fleet will detach two Loening Amphibians shortly with orders to prepare a complete mosaic of the Crescent City, Cal. district, preparatory to the establishment in that location of a cardinal Naval aviation base.

Crescent City, Cal., where a Naval base will be established

The departure of the planes and their operations will be entirely under the direction of Comdr. Karl Smith, Engineering Officer of the Aircraft Squadrons of the Battle Fleet, and the operations will be directed in the field by Lieut. Ben H. Wyatt, U.S.N., who will take with him practically the identical crew he commanded in the mapping of the Alaskan littoral last Summer. The Naval expedition will base in Lake Earle.

This represents the first important Naval aviation extension in the Pacific since the War, and is one of the initial forward moves in Naval aviation under the Assistant Secretary for Air in the Navy Department.

According to Lieut. B. P. Donnelly, of the engineering Staff of the Aircraft Squadrons, it is the intention of the air forces to establish such hangars and personnel, on detached duty from the San Diego Command, as will be needed to maintain the field in an operating status, and provide an airport for all military aircraft moving northward on the airways between San Francisco and the Sound. In time of war, a patrol of the coasts to the northward would be instituted out of the new base. The position is also said to have valuable features for a submarine base and is a strategic haven of refuge for surface craft in bad weather.

From the air, the situation at Crescent City is immediately observed to offer a startling similarity, as pertains to natural defenses, to the Naval submarine and air refuges at Viequez, in the Virgin Islands. It is because of this natural advantage for submarine and air operations, as well as the position practically half-way between the two present northerly air bases of the Navy, that the fleet air command, according to Lieutenant Donnelly, is anxious to complete the work.

It was originally intended to complete the Crescent City mapping as part of the Alaskan work last Summer, and Lieutenant Dillon, second in command of Wyatt's expedition, actually did complete the work, but crashed while en route to join the main body of the detachment at Coos Bay, suffering the loss of all his equipment, and thus necessitating a separate expedition this month.

Planes Locate Warships in Sham Battle at Night

Six destroyers and six submarines of the Navy recently attempted to force an undiscovered entrance to San Francisco Harbor. First Lieut. Frank D. Hackett, pilot, and First Lieut. Alfred W. Marriner, observer, of Crissy Field, Calif., were assigned to co-operate with the harbor defense units. They took off at 6:25 p. m., and at 9 p. m., spotted the enemy.

The squadron of destroyers was illuminated by means of parachute flares until they were picked up by the harbor boats which were pressed into service for this problem. Constant two-way radio communication was maintained.

Master Sergeant Thomas J. Fowler, pilot, and Sergeant H. B. Kannolt, observer, were assigned as the relief, and took off at 9:20 p. m. They maintained contact until the problem was completed.

Color of Navy Planes to Match Ship

New identification colors have been assigned all planes of the battleship divisions. The after part of the fuselage and tail surfaces of all planes are now painted the color corresponding to the color of the tops of the turrets of the ship to which the plane is assigned. The same surfaces of the planes attached to division flagships are painted the colors and follow the outline of the division flag.

In addition to the above, the forward part of the main pontoon of all number one planes of Battleship Division Three are painted red; of Battleship Division Four white; and of Battleship Division Five yellow. The stern of the main pontoon of all number two planes are painted the same color.

It is believed that this scheme of identification will prove of great advantage both between planes in the air and between surface ships and aircraft.

Class for Lighter-than-Air Flying Starts Feb. 15

The Navy Department has announced that a class of eight officers will be assembled at the Naval Air Station, Lakehurst, N. J., on Feb. 15, 1927, for training in lighter-than-air craft. The class will probably consist of two lieutenant commanders, two lieutenants and four lieutenants (jg) or ensigns. Applications have been requested from officers throughout the service.

Applicants will be required to pass a physical and psychological examination given by a naval medical officer qualified in aviation medicine. Only those officers who have successfully passed the physical and psychological examinations within the six months immediately preceding Feb. 15, 1927, will be considered for assignment to this training class.

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Ensigns junior to the class of 1924 are not eligible for this duty.

This course of training is to provide replacements for officers already on airship duty and to provide for the expansion in that branch of the naval air service called for by the five-year development program.

At present there are eight airship pilots at Lakehurst. Twelve more now under training will be qualified by the first of the year.

There are approximately twenty other officers on aviation duty and twelve in general service who are qualified in lighter-than-air aviation.

However, most of these have not been trained in rigid airship operation and would require a refresher course of instruction before becoming available for duty on modern airships.

When the five-year aircraft building program is completed the Navy Department hopes to have forty-seven trained rigid airship pilots on duty in that branch of the service.

Army Air Orders

Capt. Robert Oldys, Air Corps, is appointed acting liaison officer, Army War College, during temporary absence of Major Herbert A. Dargue, Air Corps.

Capt. Russell C. Snyder, Field Artillery, 76th Field Artillery, Presidio of Monterey, Cal., detailed in the Air Corps, Brooks Field.

First Lieut. Roy P. Huff, Field Artillery, upon completion of tour of foreign service, detailed in Air Corps, Brooks Field.

Capt. James M. Adamson, Jr., Cavalry, relieved from assignment to the 11th Cavalry, Camp S. J. Hearn, Cal., and is detailed in the Air Corps, Brooks Field.

The transfer of Sec. Lieut. Newell Edward Watts, Air Corps, to the Infantry, is announced. Lieutenant Watts is relieved from further attachment to the Sec. Div., and is assigned to the Infantry of that Division, and will report in person to the commanding general Fort Sam Houston.

Sec. Lieut. James H. Leusley, Air Corps (Field Art.) relieved from detail in the Air Corps, Fort Sam Houston, and is assigned to Field Artillery Sec. Div., with station at Fort Sam Houston.

Lieut. (jg) Robert W. Morse det. VS Sqd. One, Aircraft Sqdns., Setg. Flt., to Nav. Air Sta., Pensacola.

Lieut. (jg) Edward S. Mulheron det. USS Doyen, to temp. duty Nav. Air Sta., Pensacola.

Lieut. (jg) Apollo Soucek det. VO Sqd. One, Aircraft Sqdns., Battle Flt., to Navy Yard, Phila.

Lieut. (jg) William B. Whaley det. VS Sqd. One, Aircraft Sqdns., Setg. Flt., to Nav. Air Sta., Pensacola.

Lieut. Comdr. John C. Adams det. USS Langley, to Nav. Air Sta., San Diego, Cal.

Lieut. Francis E. Tierney det. Nav. Air Sta., San Diego, Cal., to USS Langley.

Comdr. Charles S. McWhorter det. command USS McDermut, to temp. duty Nav. Air Sta., Pensacola.

Lieut. Felix L. Baker det. VF Sqd. One, Aircraft Sqdns., Battle Flt., to Nav. Air Sta., Pensacola.

Lieut. Eugene F. Burkett det. Aircraft Sqdns., Battle Flt., to Nav. Air Sta., Pensacola.

Ensign Robert G. Lockhart det. Nav. Air Sta., Pensacola, to USS Charles Ausburn.

Ensign Adolph H. Oswald det. Nav. Air Sta., Pensacola, to USS Sands.

Lieut. Reuben H. Hunt det. Nav. Trng. Sta., San Diego, to Nav. Sta., Tutuila, Samoa.

Navy Air Orders

Lieut. Comdr. Wallace L. Lind det. U.S.S. Arizona, to Nav. Hosp., Mare Island, for treatment. Orders Oct. 12 revoked.

Lieut. Calvin T. Durgin to Aviation Detachment of VO Sqd. 2, U.S.S. New Mexico.

Lieut. William A. Lynch det. Nav. Air Sta., Pensacola, to U.S.S. V-2.

Lieut. (jg) George W. Welker, Jr. det. U.S.S. Milwaukee, to temp. duty Nav. Air Sta., Pensacola. Orders Nov. 5 revoked.

Capt. Edward A. Duff det. Marine Bks., Parris Island, to Nav. Air Sta., Lakehurst.

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INDEX TO ADVERTISERS

Advance Aircraft Co. 987
Aero Supply Co. 1011
Aircraft Service Directory 1020-1021-1022
Alexander Aircraft Co. 1013-1014
American School of Aviation 1016
Arthur & Co., Wm. E. 1021

B. G. Corporation 1009
Boston Newswriting Service 1022
Box 522 1021

Classified Advertising 1022
Crawford Airplane Corp. 1021
Curtiss Aeroplane & Motor Co., Inc. 1024

Decatur Aircraft Co. 1022
Detroit Aero Motors Co. 1021

Edo Aircraft Corp. 1011

Fischer & Jacobs, Inc. 1021

Guggenheim School of Aeronautics 1022

Hall, Inc., Chas. Ward 1010
Hamilton Aero Mfg. Co. 1020
Hartzell Walnut Propeller Co. 1020
Haskelite Mfg. Corp. 1021
Hess Aircraft Co. 1016
Huff-Daland & Co. 1020

Ireland, G. S. 1021

Johnson Motor Products Co. 1020

Kreider-Reisner Aircraft Co., Inc. 1021

Lincoln Standard Aircraft Co. 1021
Loening Aeronautical Engineering Co. 1012
Logan Airplane Co., F. J. 1021
Ludington Exhibition Co. 1021

Miller, Palmer Company 1020
Monumental Aircraft Co. 1020
National Aeronautic Association 1022
Nicholas-Beazley Airplane Co. 1020

Pal-Waukee Airport and Service Station 1013
Paragon Engineers, Inc. 1022
Perry-Austen Mfg. Co. 1016
Phenix Aircraft Products Co. 1021
Pioneer Instrumnt Co. 1020
Pitcairn Aviation, Inc. 1007
Polachek, Z. H. 1022
Pratt & Whitney Aircraft Co. 989

Racine Radiator Co. 1010
Rand McNally and Co. 1015
Reed, S. A. 1020
Ryan Airlines, Inc. 1012

Scintilla Magneto Co., Inc. 1003
Service Steel Co. 1020
Seversky Aero Corp. 1013
Southern Airways, Inc. 1020
Summerill Tubing Co. 1014
Swallow Airplane Mfg. Co. 1023
Sweebrock Aviation Co. 1020

Tips & Smith 1021
Titanine, Inc. 1014

Vacuum Oil Co. 986
Van Schaack Bros. Chemical Works, Inc. 1013

Where to Fly 1017-1018
Wies, Inc., Geo. A. 1020
Wood Elastic Web. Co., J. W. 1013
Wright Aeronautical Corp. 990

Yackey Aircraft Co. 1020

PUBLISHER'S NEWS LETTER

The closing of the year 1926 will bring into being the long expected regulations of the new Aeronautics Branch of the Department of Commerce. The first draft has been published, and the revised rules have been privately circulated. Suggestions have been made and changes incorporated so that until the final copy has been approved it is impossible to make any comments that will have any finality. The latest draft is so much better, in some particulars, than the general plan considered for the last few years by Congress that all interested in aviation have much to be thankful for. If intrastate flying, as well as interstate, had come under the new law, the conditions would have been very different from those that exist today. Senator Bingham is to be congratulated on the stand that he took as to the constitutionality of complete regulation. AVIATION has also been in favor of having only those planes that fly between states come under the regulations. The extent of the supervision has also been stretched as far as possibile under the interstate commerce decisions of the Supreme Court, so that aircraft using the Government airways, also, come under the new rules.

* * * *

Another limitation that will help to keep the present market for inexpensive airplanes broad and unhampered by petty restrictions is that only aircraft used in commerce are to be controlled. This will permit of a wide interpretation and allow many civilians to fly for pleasure that would otherwise feel that the difficulties and obstacles were too great. This is what has happened abroad, where the regulations have been made so severe. Many of the hardships that would have been encountered under the first draft, have been eliminated and, with one or two very important exceptions, it may be said that the restrictions as they stand at present are about the minimum that could be placed in such a document and still have it follow the sprit of the law. Regulation in every form is distasteful and undoubtably there will be many complaints at first while the new regulations are being applied. Many changes will undoubtably be necessary and it has been very pleasing to observe that suggestions made by competent critics have received every consideration. AVIATION will always be glad to print suggestions and criticisms of the working of the new rules, but will try in all cases to give both the criticism and the comments of the new Bureau. The new regulations will only be as efficient as the inspectors make them, and it is here that the greatest cause for complaint will probably arise. A new personnel recruited and trained in a short period and without precedents to guide it will have a difficult problem to solve. The inspection systems of the other services have always been a source of controversy and, with a new set of rules and a new staff of inspectors, the difficulties are certain to be many.

* * * *

AVIATION has been opposed to regulation, speaking generally, as it has seen the almost complete discontinuance of aerial service flying abroad and such as has been allowed has had to operate under very heavy expense. Sir Alan Cobham gives, in his book "Skyways", an example of his difficulties:

> Firstly I had to get my pilot's licence. When I presented myself at the Air Ministry and stated my case to an official, he retorted, "How do I know you can fly?" (quite right and proper). So I produced a letter from my late C. O. vouching for my capabilities as a pilot. The official read it and grunted, "May be a pal of yours, for all I know." I think I had a few words to say after this, and the upshot was that I was granted a "B" licence which entitled me to carry passengers for hire, remuneration, or reward. I may mention that it is a far different thing to get a "B" licence to-day.
>
> In civil aviation the engine of an aeroplane, and also the aeroplane itself must be signed for by a licenced engineer each morning before it takes off, to verify that it is O. K. for flight. The engineer is responsible for its airworthiness. Fred Holmes got his licence; and then we discovered that we had only just begun in the licencing business. Firstly the aeroplane had to pass inspection by an Aircraft Inspection Department inspector, and if satisfactory would receive an airworthy certificate. Secondly we had to get a certificate of registration, and thirdly we discovered that every field or landing ground from which we should take passengers up would have to be inspected by an Air Ministry official, who in turn would recommend it to the Air Ministry who, eventually, would grant us a licence to use that field for a given period.
>
> Having found our first three flying grounds, we proceeded to make application for the necessary licences. I remember an Air Ministry official telling me that a licence would take about three weeks to go through, as they had no one for the moment to look at the field. I mentioned that I wanted two more licences—he was quite staggered. Then timidly we mentioned that we would be putting up two or three shows a week and would require licences for nine or ten fields every month. It was the final blow; he was about to forbid us to fly, but we reminded him that it was in the interests of civil aviation. I have since been told that a special office was opened on our account to cope with the extra work involved.

This was in 1919 in England and it may be realized what obstacles were placed in the way of the development flying. If such regulations had been in effect in this country, it can be easily imagined how airminded the people of the United States would have been. The Gypsy pilot has rendered a real service to the advancement of aeronautics in this country even though he has been criticized and condemned by many. It is from the ranks of the itinerant airman that some of the most important fixed base operators have come. Sir Alan Cobham, with his record of 10,000 passengers while flying as a typical Gypsy pilot is a timely example. However, Congress has spoken and it is fortunate that a pilot who has great sympathy with the whole aviation program is to administer it. Here's hoping!—L.D.G.

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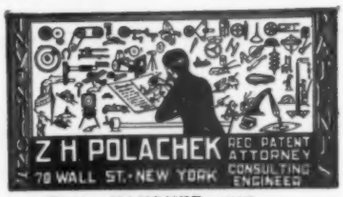

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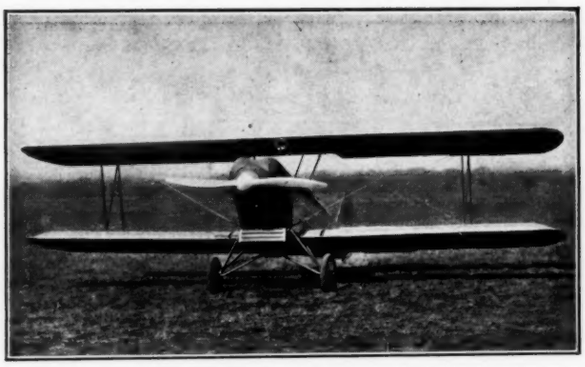

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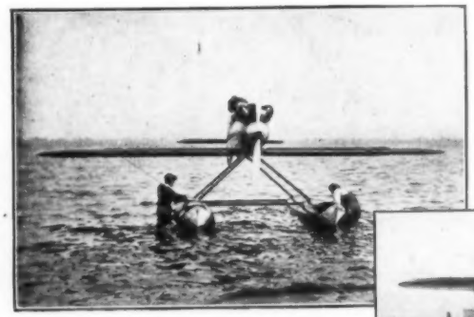

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